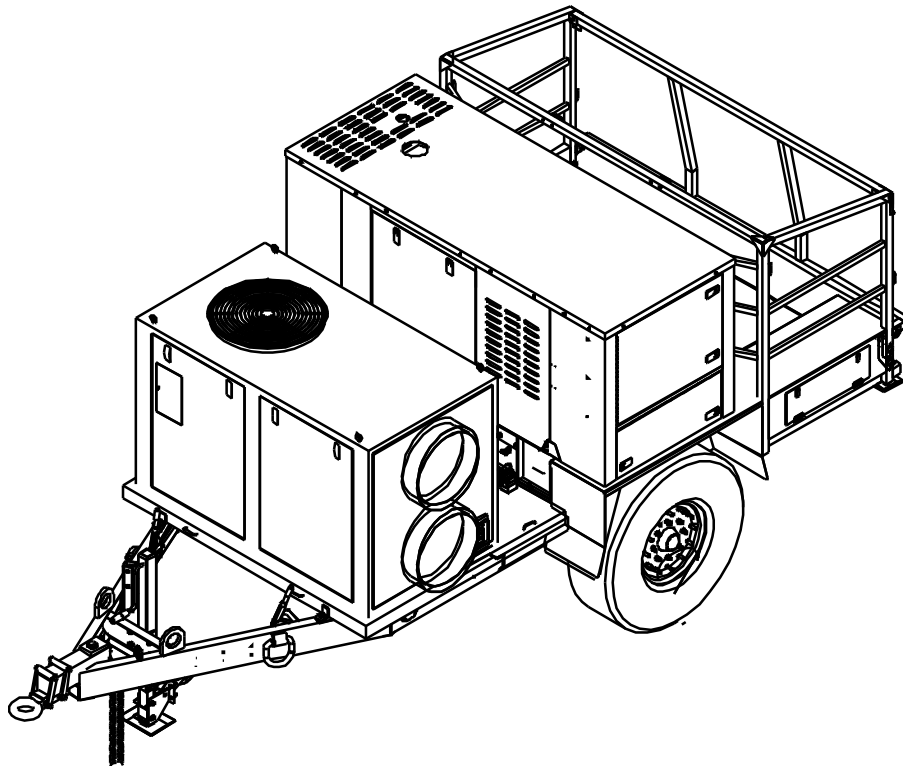


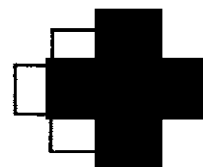
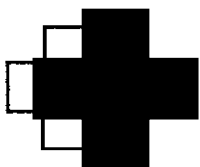
TECHNICAL MANUAL
OPERATOR AND FIELD MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST
FOR
HP-2C/185 UST Trailer



TM: 1006310

31 AUGUST 2020

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5

SAFETY STEPS TO FOLLOW IF SOMEONE IS VICTIM OF ELECTRICAL SHOCK.

1

SEND FOR HELP AS SOON AS POSSIBLE.

2

DO NOT TRY TO PULL OR GRAB INDIVIDUAL.

3

IF POSSIBLE, TURN OFF ELECTRICAL POWER.

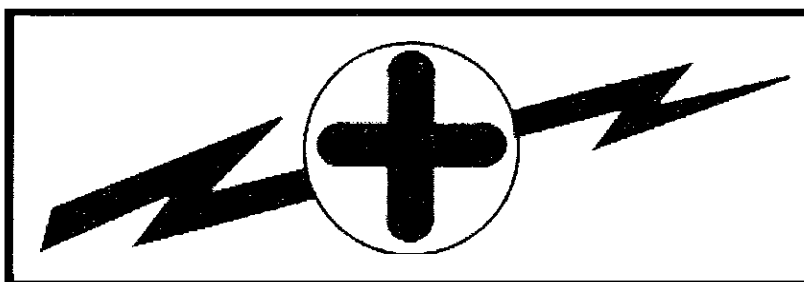
4

IF YOU CANNOT TURN OFF ELECTRICAL POWER, PULL, PUSH, OR LIFT PERSON TO SAFETY USING A DRY WOODEN POLE, A DRY ROPE, OR SOME OTHER INSULATING MATERIAL.

5

AFTER INJURED PERSON IS FREE OF CONTACT WITH SOURCE OF ELECTRICAL SHOCK, MOVE PERSON A SHORT DISTANCE AWAY. IMMEDIATELY START ARTIFICIAL RESUSCITATION.

WARNING



HIGH VOLTAGE

is used in operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with operation and hazards of the equipment and who is competent in administering first aid. When operators aid the technician, the technician must warn operators about dangerous areas.

When possible, shut off power supply to equipment before beginning work on equipment. Take particular care to ground every capacitor that could potentially store a dangerous electrical charge. Turn off power when working inside equipment. Always ground every part of equipment before touching it.

Be careful not to contact high-voltage connections or 115 VAC input connections when installing or operating equipment.

Whenever the nature of operation permits, keep one hand away from equipment to reduce hazard of current flowing through the body.

WARNING: Do not be misled by the term "low voltage." Under adverse conditions, potentials as low as 50 volts may cause death.

For Artificial Respiration, refer to FM 4-25.11.



ELECTRICAL HAZARD

Under adverse conditions, voltage used in this equipment can cause death or serious injury. Observe the following safety precautions:

GROUND THE EQUIPMENT

Before connecting primary power cables, connect grounding cable from ground lug on power control box to earth ground. Do not remove grounding cable until signal cables and primary power cables have been disconnected and Genset has been shut down.

AVOID THE POWER INPUT

Be careful not to contact 208/115 VAC connections when installing or servicing equipment.

DO NOT SERVICE ALONE

Never work on equipment unless there is another person nearby who is familiar with operation and hazards of equipment and who can administer first aid.

USE ONLY ONE HAND

Whenever possible, use only one hand to service equipment. Keep other hand away to reduce hazard of current flowing through vital organs of the body.

WARNING



BURN HAZARD

Equipment and Genset may be hot to touch. Allow unit to cool before handling or use gloves when handling. Serious injury or death from burns or scalding could result from contact with high-pressure steam and/or liquid. Failure to observe this warning can result in serious injury.

WARNING

HIGH VOLTAGE

RF energy is present near the antenna during transmission. Touching the antenna during transmission may result in death or serious injury. Maintain at least 30 inches between vehicular antennas and personnel during transmissions.

WARNING

Death or serious injuries can result:

- When antenna tip caps are not installed on antennas.
- When an antenna is not tied down, it could hit a fixed object such as an overhead bridge, tree limb, etc. Antenna could break, and flying antenna parts might strike nearby personnel.

WARNING



HEAVY EQUIPMENT

Improperly lifting or carrying heavy equipment can result in serious injury or death. Refer to the following weight limits as guidelines:

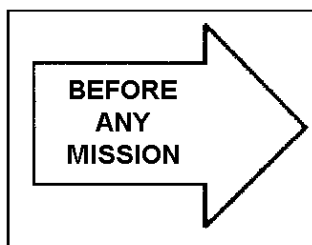
Handling Function	One-Person Max. Lift	Two-Person Max. Lift	Two-Person Max. Lift (Male Only)
Lift object from floor and place it on surface not greater than 5 feet above floor.	37 lb.	74 lb.	112 lb.
Lift object from floor and place it on surface not greater than 3 feet above floor.	44 lb.	88 lb.	174 lb.
Carry object 33 feet or less.	42 lb.	84 lb.	164 lb.

WARNING

The ECU for the trailer weighs 520 lbs. Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the ECU without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

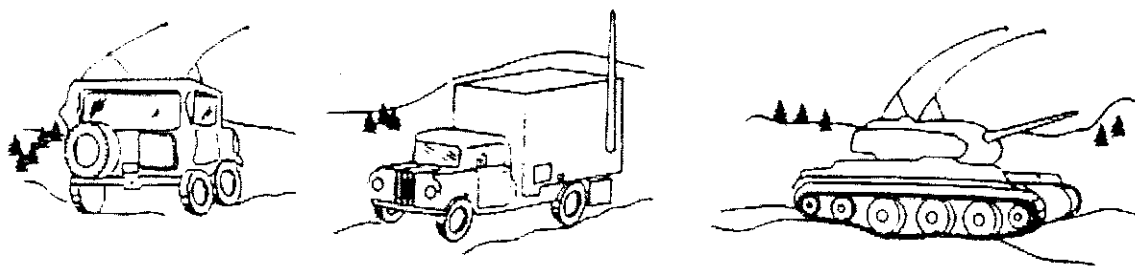
WARNING

SERIOUS INJURY OR DEATH CAN RESULT IF THE FOLLOWING ARE NOT CAREFULLY OBSERVED WHEN INSTALLING AND USING THE ANTENNAS USED WITH YOUR RADIO SETS.



1. ARE THERE ANY POWER LINES IN YOUR AREA OF OPERATION?
2. HOW HIGH ARE THESE POWER LINES?
3. HOW TALL ARE POLES OR TOWERS CARRYING POWER LINES?

MOBILE OPERATION WITH WHIP ANTENNAS

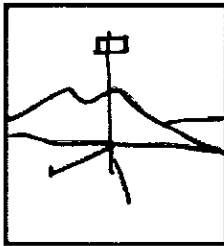


DO NOT STOP YOUR VEHICLE UNDER POWER LINES

- If possible, try to maintain mobile communications with your antenna(s) tied down.
- Make sure an antenna tip cap is securely taped on end of each whip antenna.
- Do not lean against or touch a whip antenna while transmitter is on.
- During cross-country operation, do not allow anyone to stick an arm, leg, or weapon over sides of vehicle. Serious or fatal accident can occur if your antenna accidentally touches a power line, and a leg, arm, or weapon contacts a damp bush or a ground.
- If you are not sure that an antenna or your vehicle will clear a power line, stop before you get close to the power line. Carefully tie down antenna or remove antenna sections to make sure that you can drive safely under power line.
- Do not climb on top of vehicle or shelter during radio transmissions.

FIXED OPERATION WITH LONG-RANGE ANTENNAS

WARNING



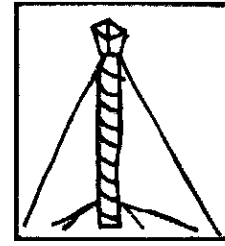
TELESCOPING
ANTENNA MAST



EXTENDED RANGE
ANTENNA



DOUBLET
ANTENNA



TYPICAL
TOWER

NEVER RAISE LONG-RANGE ANTENNAS DIRECTLY UNDER POWER LINES

If you raise long-range antennas near power lines, power line poles, towers, or buildings with overhead power line connections, never put the antenna closer than two times the antenna height to the base of the power line, pole, tower, or buildings.

NEVER RAISE ANY LONG-RANGE ANTENNA WITHOUT A FULL TEAM

Before raising a long-range antenna, inspect all of the parts making up the antenna kit. Do not raise the antenna if any parts are missing or damaged.

Do as much of the assembly work as possible on the ground.

When raising the antenna, allow only team personnel in the area.

Make sure that the area you use for the anchors is firm. If the ground is marshy or sandy, get specific instructions from your crew chief or supervisor on how to reinforce the anchors.

When selecting locations for anchors, avoid traveled areas and roads. If you cannot avoid these areas, get specific instructions from your supervisor as to what clearance your guy wires must have over the traveled areas and road.

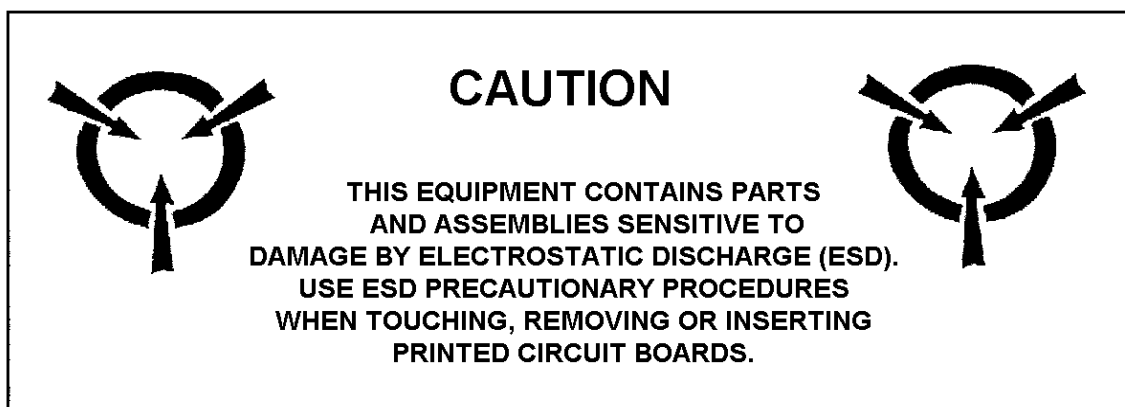
Clearly mark all guy wires and ropes with the warning flags or signs supplied by your unit. In an emergency, use strips of white cloth as warning streamers.

If you suspect that power lines have made accidental contact with your antenna, stop operations, rope off the antenna area, and notify your superiors.

If weather in your area can cause ice to form on your long-range antenna and its guy wires and ropes, add extra guys to support the system. Rope off the area and post it with warning signs like "BEWARE OF FALLING ICE."

Do not try to raise any antenna during an electrical storm.

Closely monitor your anchors and guys. Check them daily and immediately before and after bad weather.



ESD

CLASS 1

GENERAL HANDLING PROCEDURES FOR ESD ITEMS

- USE WRIST GROUND STRAPS OR MANUAL GROUNDING PROCEDURES.
- PERIODICALLY CHECK CONTINUITY AND RESISTANCE OF GROUNDING SYSTEM.
- KEEP ESD ITEMS IN PROTECTIVE COVERING WHEN NOT IN USE.
- USE ONLY METALIZED SOLDER SUCKERS.
- GROUND ALL ELECTRICAL TOOLS AND TEST EQUIPMENT.
- HANDLE ESD ITEMS IN PROTECTED AREAS ONLY.

MANUAL GROUNDING PROCEDURES

- MAKE CERTAIN EQUIPMENT IS POWERED DOWN.
- TOUCH PACKAGE OR REPLACEMENT ESD ITEM TO GROUND BEFORE OPENING.
- TOUCH GROUND PRIOR TO REMOVING ESD ITEMS.
- TOUCH GROUND PRIOR TO INSERTING REPLACEMENT ESD ITEMS.

ESD PROTECTIVE PACKAGING AND LABELING

- COVER ANTISTATIC MATERIAL WITH AN OUTER WRAP OF EITHER TYPE 1 ALUMINIZED MATERIAL OR CONDUCTIVE PLASTIC FILM OR HYBRID LAMINATED BAGS HAVING AN INTERIOR OF ANTISTATIC MATERIAL WITH AN OUTER METALIZED LAYER.
- LABEL WITH SENSITIVE ELECTRONIC SYMBOL AND CAUTION NOTE.

WARNING

Lithium-Sulfur Dioxide Non-Rechargeable Batteries

Lithium-Sulfur Dioxide (LiSO²) batteries have been designed to provide a safe, high-capacity power source in a relatively small lightweight package. However, if misused or abused, these batteries can be dangerous.

LiSO² batteries contain liquefied sulfur dioxide (corrosive causes burns to the skin), acetonitrile (mildly toxic), and lithium metal (extremely reactive and flammable). All LiSO² batteries have multiple safety features to contain these hazards.

Store LiSO² batteries at temperatures below 130°F. Segregate different battery chemistries from each other.

Keep batteries in original packaging until ready for use. Examine packages/batteries for bulging, cracking, or any signs of leakage before putting batteries into equipment. Use only appropriate batteries for each particular item.

When replacing batteries in equipment containing more than one LiSO² battery, replace all LiSO² batteries at the same time. Replace with batteries from same contract number and date code only.

Never charge a LiSO² battery.

Never short-circuit terminals.

Remove batteries from equipment if it is not to be used within 30 days.

Depleted batteries should be turned in to designated personnel for disposal processing (CDD activation) and disposal in accordance with local regulations or through Defense Reutilization and Marketing Office.

In event of a venting, clear area until pungent odor of sulfur dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

Refer to TB 43-0134, Battery Disposition and Disposal, for additional information.

DO NOT mix primary and rechargeable batteries in equipment, such as BA-5590/U and the BB-390A/U batteries.

When using LiSO² batteries, immediately power down equipment and replace with new batteries upon low power indication.

WARNING

Compressed air is dangerous and can cause serious bodily harm. Protective means or methods should be observed to prevent a chip or particle (of any size) from being blown into eyes or skin of operator or other personnel. Do not use compressed air for cleaning purposes unless you can reduce it to less than 30 pounds per square inch gauge (30 psig) and then only with effective chip guarding and personnel protective equipment (industrial safety glasses and full face shield).

WARNING

Trichlorotrifluoroethane, trichloroethane, and similar chemical solvents threaten public health and the environment by destroying ozone in earth's upper atmosphere. Use only nonhazardous cleaning material such as a clean cloth, water, and mild detergent.

WARNING

Grounding trailer equipment is essential to prevent serious electrical shock or even death. Most favorable trailer grounding is achieved when the trailer is directly connected via proper sized grounding wire to ground rod assembly. Refer to "Earth Grounding and Bonding Pamphlet", CECOM TR-98-6, Oct 1998 for more detailed information on grounding equipment.

WARNING

To avoid possible electrical shock, ensure that grounding cables from ground lugs are connected to GROUND on frame of the trailer prior to power up. Do not remove grounding cable while powered up.

WARNING

To avoid possible electrical shock, do not remove grounding cable until signal cables and primary power cables have been disconnected.

WARNING

Eye protection and gloves are required for deploying and removing trailer grounding. Notify service level maintenance of any mushroomed stake heads. Visually inspect all cable before handling. Use gloves when handling cable.

WARNING

If a circuit breaker does not stay in ON position when closed, DO NOT attempt to close it repeatedly. That could create an overload situation hazardous to personnel and equipment. Investigate and identify cause of problem. Correct situation before attempting to close breaker again.

WARNING

To avoid electrical shock and damage to equipment, be certain POWER ON/OFF circuit breaker is set to OFF and power cable is disconnected at power source before disconnecting signal cables.

WARNING

Hearing protection is required when within 8 feet of the Genset operating position.

WARNING

Items that may shatter (i.e., displays or any other type of glass or plastic) should be visually inspected prior to use to prevent potential injury from broken edges. Failure to observe this warning can result in serious injury.

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury.

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any troubleshooting procedures.

WARNING

Critical fasteners used to secure equipment should be installed and periodically inspected for retention. Missing fasteners should be noted and replaced. Loose fasteners should be tightened. Failure to observe this warning can result in serious injury.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before troubleshooting.

WARNING

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

WARNING

Diesel fuel is flammable. Do not fill fuel tank with engine running, while smoking, or when near an open flame. Never overfill tank or spill fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death.

WARNING

BE AWARE: Nuclear, Biological, Chemical (NBC) protective masks will not protect from carbon monoxide poisoning.

WARNING

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

WARNING

REFRIGERANT UNDER PRESSURE

Death or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part of the system that contains refrigerant. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas.

WARNING

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

WARNING

Brazing alloys and flux contain materials that are hazardous to health. Avoid breathing vapors or fumes from brazing operations. Perform operations only in well ventilated areas. Wash hands with soap and water after handling brazing alloys and flux. Wear gloves and protective goggles or face shield to protect against burns.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

WARNING

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be removed and recovered from the system and the entire system must be purged with dry nitrogen before beginning any brazing operation.

WARNING

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or safety glasses in any situation where skin or eye contact with refrigerant is possible.

WARNING

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

WARNING

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

WARNING

Never introduce liquid refrigerant into the suction shut off valve. This can cause damage to the compressor.

WARNING

The system must be evacuated before charging. Moisture and air in the system will prevent the refrigeration unit from operating properly.

WARNING

If Genset is tied into a power grid, local/remote monitoring devices may attempt to start the local Genset. Ensure that all Genset-to-Genset communication lines are disconnected prior to performing any procedures. Failure to observe this warning can result in serious injury or death.

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

WARNING

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

WARNING

The Genset weighs 1350 lbs (612.35 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the Genset without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

WARNING

Removing metal parts could be dangerous to personnel. Always wear eye protection when replacing wheel studs. Failure to follow this warning may result in injury to personnel.

WARNING

The cotter pin prevents the spindle nut from coming loose. Failure to install the cotter pin properly will cause the spindle nut to back off of the spindle causing loss of wheel assembly.

WARNING

Never replace only one brake shoe. Combinations of old and new brake shoes will cause uneven braking. Accidents causing serious injury or death to personnel or damage to equipment may result.

WARNING

DO NOT allow grease to contact brake shoe linings. Wipe excess lubricant from the brake shoe linings to prevent grease soaking into the materials. Brake shoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

WARNING

When the following step is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the trailer and/or its contents.

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

WARNING

Trailer may move during process. DO NOT lie under trailer while moving vehicle. Severe injury may result to personnel.

WARNING

Use caution when removing hydraulic push rod assembly due to spring tension.

WARNING

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves and use solvent only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F to 138°F (38°C to 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

WARNING

Empty fuel tank weighs 33 pounds and may require two persons to safely remove to avoid injury to personnel.

WARNING

DO NOT handle brake shoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

WARNING

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

WARNING

Hot coolant is under pressure. Opening the radiator while the coolant is hot can result in possible burns and damage to equipment.

WARNING

High voltage and amperage present at electrical connections. Do not enter ECU with power applied. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with ECU operating.

WARNING

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

WARNING

Ensure that trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to the trailer and/or its components could result from trailer suddenly rolling or tipping.

WARNING

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the trailer and/or its contents.

WARNING

Tire and wheel assembly weigh in excess of 110 lbs. Removal and replacement require a two person lift to avoid injury to personnel.

WARNING

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the trailer. Jewelry can catch on equipment and cause injury, or may short across electrical circuit and cause severe burns or electrical shock.

WARNING

Wear eye protection and gloves when hammering stakes and ground rod sections. Failure to observe this warning may result in injury to the eye or exposed skin from flying metal fragments.

WARNING

Cut end of air intake is extremely sharp. Exercise care to prevent injury.

WARNING

If heater has been operating exhaust may be extremely hot. Allow time to cool before removing.

WARNING

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocant and, therefore, must be discharged in a ventilated location.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

NOTE: Zero in the "Change No." column indicates an original page or work package.

Date of issue for the original manual is:

Original: 29 MAY 2009

Revised: 31 AUGUST 2020

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 44 AND TOTAL NUMBER OF WORK PACKAGES IS 135, CONSISTING OF THE FOLLOWING:

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Warning summary (16 pgs)	1	WP 0021 (6 pgs)	1
i – xxx	1 1 EC-20320	WP 0022 (6 pgs)	1
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Blank	1	WP 0024 (2 pgs)	1
WP 0001 (6 pgs)	1	WP 0025 (18 pgs)	1
WP 0002 (8 pgs)	1	WP 0026 (28 pgs)	1
WP 0003 (22 pgs)	1	WP 0027 (30 pgs)	1
Chp 2 title page	1	Chp 6 title page	1
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WP 0007 (12 pgs)	1	WP 0031 (2 pgs)	1
WP 0008 (12 pgs)	1	WP 0032 (2 pgs)	1
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Chp 3 title page	1	WP 0034 (2 pgs)	1
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		WP 0053 (4 pgs)	1
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		WP 0055 (6 pgs)	1

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HOW TO USE THIS MANUAL

PURPOSE AND SCOPE

This technical manual provides Crew and Unit level maintenance information for the HP-2C/185 UST Trailer. The information includes equipment description and theory of operation, Crew instructions, troubleshooting procedures, maintenance and testing procedures, and supporting data including Repair Parts and Special Tools List (RPSTL) for identifying and ordering repair parts.

ARRANGEMENT, IDENTIFICATION AND LOCATION OF FRONT MATTER, REAR MATTER, CHAPTERS, AND WORK PACKAGES

This manual is composed of front matter, chapters containing Work Packages (WPs), appendixes, and rear matter. These areas are described in greater detail in the following paragraphs.

Front Matter

The front matter includes such items as the Warning Summary, List of Effective Pages/WPs, Table of Contents, and How to Use This Manual.

Chapters and WPs

Chapter 1 - General Information, Equipment Descriptions, and Theory of Operation. This chapter provides general and descriptive information concerning the equipment. Theory of Operation appropriate to the maintenance level covered is also provided.

Chapter 2 - Operating Instructions. This chapter provides a description and location of the controls, indicators, and connectors on each piece of equipment used in the trailer. It also contains a description and location of the decals and data plates for each piece of equipment and operation under usual and unusual conditions.

Chapter 3 – Crew Troubleshooting Procedures. This chapter provides operational checkout and troubleshooting procedures appropriate to the maintenance level covered.

Chapter 4 – Crew Maintenance Instructions. This chapter provides information on performing preventive maintenance actions. Included are instructions concerning service upon receipt of equipment, inspection, preventive maintenance checks and services, and repair actions.

Chapter 5 – Maintainer Troubleshooting Procedures. This chapter provides troubleshooting/fault isolation procedures appropriate to the maintenance level covered.

Chapter 6 – Genset Instructions. This chapter provides information on performing preventive maintenance, removal/replacement of components of the diesel engine, barrier panel and control panel of the Genset. Appropriate adjustment procedures are present where applicable

Chapter 7 – ECU Instructions. This chapter provides information on performing preventive maintenance, removal/replacement of components related to the Environmental Control Unit (ECU).

Chapter 8 – Trailer Instructions. This chapter provides information on performing preventive maintenance, removal/replacement of components to include brake, brake components, and electrical on the trailer.

Chapter 9 – Parts Information. This chapter provides information on the Repair Parts and Special Tools List (RPSTL). This chapter also contains the national stock number list and part number list. The RPSTL items are used to support the maintenance actions in Chapters 6 through 8.

Chapter 10 – Destruction of Equipment to Prevent Enemy Use. This chapter provides information on how to damage the components to prevent usage by the enemy.

Chapter 11 - Supporting Information. Included are a list of reference material, the Maintenance Allocation Chart (MAC) which identifies maintenance actions and their maintenance levels, Components of End Item (COEI) list, Basic Issue Items (BII) list, Additional Authorization List (AAL), and Expendable and Durable Items List.

Rear Matter

The rear matter section includes an alphabetical index and schematics.

Identifying WPs

Each WP is identified by a six-digit number. The first four digits are assigned sequentially. The last two digits, if other than 00 (01, 02, 03, etc.), indicate WP revision level. WPs are revised due to equipment configuration differences, support equipment differences, or other similar situations. For example:

- WP 0015 00 might cover installation of a handle on a basic unit.
- WP 0015 01 might cover installation of the same handle on a differently configured unit.
- Installation of an alternate handle in place of the original handle, requiring a different procedure.

Locating WPs

There are two ways to locate a WP when the number is not known, using the Table of Contents in the manual's front matter and using the Index in the manual's rear matter.

Locating a WP in the Table of Contents

First determine the category of the WP subject and then find the appropriate chapter in the Table of Contents. Scan the WP titles in that chapter until the WP subject matter is found. In the example below, it is desired to locate the PMCS for the CREW (shaded). PMCS falls into the category of maintenance. Go to the Table of Contents and find the chapter titled "CREW Maintenance Instructions." (Make sure the chapter applies to the appropriate maintenance level). Scan the WP titles within that chapter until "PMCS" is found, and follow the leader line to find the WP number.

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WP CONTENT AND PRESENTATION

The content and the presentation techniques used in the WPs vary according to the material covered.

Common Features

In all cases, the WP title is placed at the top of the page immediately below the manual and WP number and is set off by horizontal lines as shown below.

HP-2C/185 UST Trailer	0002
GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION	
HP-2C/185 UST Trailer	
EQUIPMENT DESCRIPTION AND DATA	

On the second and subsequent pages of the WP, the manual and WP number is repeated. The page number is placed at the bottom of the page and consists of the WP number and a sequential number denoting the page within the WP as shown below.

0002-1

Paragraphs are not numbered.

Primary paragraphs are denoted by headings set in **BOLD UPPER CASE (CAPITAL)** type. Secondary and lower-level paragraphs are denoted by headings set in Bold Upper and Lower Case type. These paragraphs always relate to and are subordinate to the most recent primary paragraph heading.

Figures and tables (excluding the RPSTL) are numbered sequentially within each WP starting with numeral 1.

Descriptive Narrative

For WPs consisting primarily of descriptive narrative (equipment data, theory of operation, etc.) text begins immediately below the WP title.

Procedures

The example below is for WPs consisting primarily of procedures such as maintenance tasks, operating instructions, etc. The initial setup section provides information on tools, material/parts, personnel required, and equipment condition. Procedural steps are numbered.

HP-2C/185 UST Trailer		0059
GENSET FUEL HOSE REMOVAL/REPLACEMENT		
INITIAL SETUP:		
Tools		References
General Mechanics tool kit (WP 0152, table 2, item 3)		WP 0005, WP 0022, WP 0044
Safety glasses		
Materials/Parts		Equipment Condition
Fuel hose		Trailer parked in operational position
Cloth, cleaning (WP 0155, table 1, item 21)		Wheels chocked
		Genset shutdown
Personnel Required		BATTERY SWITCH - OFF
One		
REMOVAL		
1. Verify that Genset has been shut down, engine is cool and that battery switch is set to OFF (WP 0005, Genset Shutdown Procedure).		
2. Remove front and rear access panels.		

In most cases, figures relating to the procedural step are also provided. When the figure is indexed (as in maintenance procedures), procedural steps include the figure number and item number inside parentheses.

Supporting Information

The Supporting Information chapters contain instructions detailing the content and presentation techniques used in the WP.

CHAPTER 1

**GENERAL INFORMATION, EQUIPMENT DESCRIPTION,
AND THEORY OF OPERATION**

FOR

HP-2C/185 UST Trailer

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION
HP2C/185 UST Trailer
GENERAL INFORMATION

SCOPE

This Operator and Field Maintenance Manual Including Repair Parts and Special Tools List (RPSTL) provides instructions and procedures for setup, operation, teardown, maintenance, and repair of the HP2C/185 UST Trailer. To simplify the discussions, this product will be referred to throughout this manual as the trailer, as the Utility Service Trailer, or as HP-2C/185. Note that there are some features discussed in this Technical Manual that are optional features. The particular system you have may or may not have all these features. A typical configuration for the HP-2C/185 is shown in Figure 1.

HP2C/185 UST Trailer

The HP2C/185 UST Trailer consists of one 18 KW, 120/208 Volt, 3-Phase, 60 Hz, diesel powered generator and one 60,000 BTU/hour Environmental Control Unit (ECU) mounted on a trailer chassis. A vehicle capable of pulling 4,200 lbs. is required to tow the HP2C/185 UST Trailer.

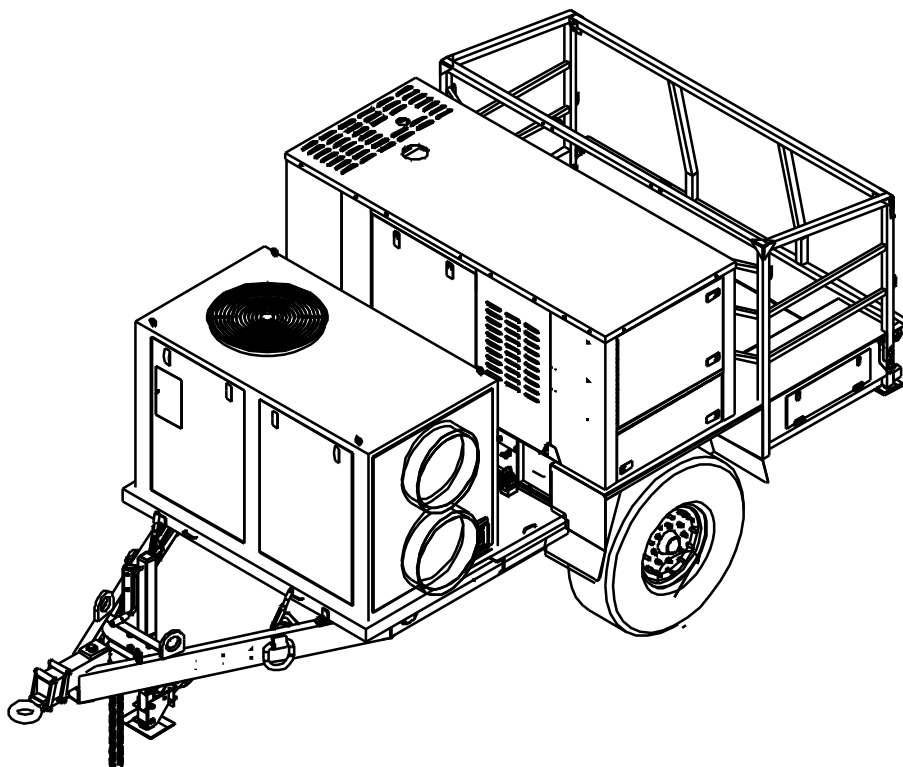


Figure 1. HP-2C/185 System Configuration.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by (as applicable) DA PAM 750-8, The Army Maintenance Management System (TAMMS) Users Manual, DA PAM 738-751, Functional Users Manual for the Army Maintenance Management Systems – Aviation (TAMMS-A); or AR 700-138, Army Logistics Readiness and Sustainability.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If the HP2C/185 UST Trailer needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance.

A Product Quality Deficiency Report, should be submitted to:

HDT Expeditionary Systems, Inc.
Technical Publications Group
5855 Endeavor Way
Tanner, AL 35671
Phone: 256.774.1563, Fax: 256.774.1567

CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with the HP2C/185 UST Trailer be reported so that the problem can be corrected and improvements can be made to prevent the problem in future HP2C/185 UST Trailer items.

Corrosion specifically occurs with metals. It is an electrochemical process that causes the degradation of metals. It is commonly caused by exposure to moisture, acids, bases, or salts. An example is the rusting of iron. Corrosion damage in metals can be seen, depending on the metal, as tarnishing, pitting, fogging, surface residue, and/or cracking.

Plastics, composites, and rubbers can also degrade. Degradation is caused by thermal (heat), oxidation (oxygen), salivation (solvents), or photolytic (light, typically UV) processes. The most common exposures are excessive heat or light. Damage from these processes will appear as cracking, softening, swelling, and/or breaking.

A Product Quality Deficiency Report, should be submitted to:

HDT Expeditionary Systems, Inc.
Technical Publications Group
5855 Endeavor Way
Tanner, AL 35671
Phone: 256.774.1563, Fax: 256.774.1567

OZONE DEPLETING SUBSTANCES (ODS)

The use of Class 1 ODS for new acquisitions has been curtailed by Section 326 of the National Defense Authorization Act of Fiscal Year 1993 (Public Law 102, 484) and related Army Policy.

DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Procedures to destroy this equipment to prevent enemy use are located in (Chapter 10, WP 0152 and WP 0153) of this manual. Additional information can be found in TM 750-244-2, Procedures for Destruction of Electronic Material to Prevent Enemy Use.

PREPARATION FOR STORAGE OR SHIPMENT

Place items in administrative storage for short periods of time when a shortage of maintenance resources exists. It should be possible to place items in a state of mission readiness either within 24 hours or within the time frame that the directing authority may determine. Keep appropriate maintenance records during storage.

Prior to placing the equipment in administrative storage, Army activities perform Preventive Maintenance Checks and Services (PMCS), complete Equipment Serviceability Criteria (ESC) evaluations, correct shortcomings and deficiencies, and complete all Modification Work Orders (MWO). When removing items from administrative storage, the operator performs PMCS to ensure operational readiness.

Inside storage is preferred for items selected for administrative storage. If inside storage is not available, use trucks, vans, or other containers.

WARRANTY INFORMATION

Report all defects to your supervisor, who will take appropriate action. Contact the Regional Support Center (RSC) representative for further information on warranted items.

The HP-2C/185 is warranted for one year. The warranty starts on the day that a U.S. Government official signs for it. This information can be found on DA Form 2408-9, Equipment Control Record. Report all defects to the supervisor, who will take appropriate action.

NOMENCLATURE CROSS-REFERENCE LIST

Common names and/or abbreviations are used in this manual to make a procedure easier to read. Table 1 matches the official nomenclatures with the common names.

Table 1. Nomenclature Cross-Reference List.

Air Conditioner	Environmental Control Unit, ECU
Air Duct Hose	Supply/Return Duct
Antifreeze	Coolant
Cable Assembly, Special Purpose	Inter-Vehicular Cable Assembly
Cinch Belt	Cinch Straps
Engine Generator	Genset
Heavy-High Mobility Multi-Purpose Wheeled Vehicle	H-HMMWV
Heating, Ventilating, and Air Conditioning	HVAC
Utility Service Trailer	HP-2C/185
Stake	Rebar/Red Stake

LIST OF ABBREVIATIONS/ACRONYMS

Table 2 is an alphabetical list of abbreviations/acronyms used throughout this manual.

Table 2. Abbreviation/Acronym List.

ABBREVIATION/ACRONYM	NAME
AC	Alternating Current
AHSS	Aux Heat Selector Switch
BII	Basic Issue Items
BR	Bridge rectifier
BTU	British Thermal Unit
CAGEC	Commercial and Government Entity Code
CB	Circuit Breaker
CCR	Contactor, Compressor
CCS	Command Center System
CHT	Contactor, Heater
CHT HIGH	Contactor, Heater High
CHT LOW	Contactor, Heater Low
CMSP	Condenser Motor Starter Protector
COEI	Components of End Item
CP	Command Post
CPC	Corrosion Prevention and Control
CPCS	Command Post Communication System
CPP	Command Post Platform
CR	Motor Compressor
D	Depot
DMR	Depot Mobilization Requirements
DS	Direct Support
ECU	Environmental Control Unit
EIR	Equipment Improvement Recommendations
EMSP	Evaporator Motor Starter Protector
ESC	Equipment Serviceability Criteria
FGC	Functional Group Code
FM	Field Manual
FU	Fuse
GB	Ground Bar
GS	General Support
HCP	Hardness Critical Procedures
HDBK	Handbook
HM	Hour Meter
HMMWV	High Mobility Multi-Purpose Wheeled Vehicle
HTC	High Temperature Cutout
HTR1	Heater, Electric 18 KW, 208 VAC
HTR2	Heater, Electric 9 KW, 208 VAC
HVAC	Heating, Ventilating and Air Conditioning
I/O	Input/Output
LED	Light Emitting Diode
MAC	Maintenance Allocation Chart
MC	Motor, Condenser Fan
ME	Motor, Evaporator Fan
MSS	Mode Select Switch
MWO	Modification Work Order
NBC	Nuclear, Biological, and Chemical
NSN	National Stock Number

Table 2. Abbreviation/Acronym List – Continued.

ABBREVIATION/ACRONYM	NAME
ODS	Ozone Depleting Substances
OPL	Out-of-Phase Light
OPL	Out-of-Phase Light
P/N	Part Number
PDB	Power Distribution Block
PDP	Power Distribution Panel
PMCS	Preventive Maintenance Checks and Services
POL	Power On Light
PQDR	Product Quality Deficiency Report
PSI	Pounds per Square Inch
PSR	Phase Sending Relay
QA	Quality Assurance
RPSTL	Repair Parts and Special Tools List
S1	Switch, Low Pressure
S2	Switch, High Pressure
S3	Switch, High Temp Stage Close
S4	Switch, Low Temp Stage Close
SDR	Supply Discrepancy Report
SMR	Source, Maintenance and Recoverability
SOP	Standing Operating Procedure
SV1	Solenoid Valve (Liquid)
TAMMS	The Army Maintenance Management System
TB	Troubleshooting
TD	Time Delay, Relay
TDR	Transportation Discrepancy Report
TMDE	Test, Measurement, and Diagnostic Equipment
UST	Utility Service Trailer
TX1	Control Transformer
U/I	Unit of Issue
UPS	Uninterruptible Power Supply
VAC	Voltage, Alternating Current
WD50	Auxiliary Heater
WP	Work Package

QUALITY OF MATERIAL

Material used for replacement, repair, or modification must meet the requirements of this Operator and Field Maintenance Manual. If quality of material requirements is not stated in this Operator and Field Maintenance Manual, the material must meet the requirements of the drawings, standards, specifications, or approved engineering change proposals applicable to the subject equipment.

SAFETY, CARE, AND HANDLING

To prevent personal injury and damage to equipment, obey the following general rules and precautions:

1. Become familiar with the warnings and cautions listed in the front of this manual.
 - a. Warnings – Present circumstances or procedures that, if not strictly adhered to, may cause injury or death.
 - b. Cautions – Present circumstances that can cause damage to equipment or loss of the mission.

SAFETY, CARE, AND HANDLING - Continued

2. Recognize that equipment in transport bags may be at least a two-person carry.
3. Ensure Genset, ECU is powered down before starting any maintenance task.
4. Recognize that equipment (Genset or ECU) may be hot. Allow equipment to cool down before performing any maintenance procedures.
5. Do not touch connector terminals with any tool, bare hands, or dirty cloth. Tools damage the connector. Dirt or sweat causes corrosion.
6. Before touching any electrical component, discharge static electricity by touching a metal chassis or cabinet. A static discharge to an electrical component can destroy internal circuits.
7. Know where emergency equipment is located. Read instructions on the fire extinguisher label.
8. Ensure hands are clean before working on equipment.

NUCLEAR HARDNESS

All Hardness Critical Procedures (HCP) in this manual are marked with the acronym "HCP" as follows:

1. When the entire task, including all paragraphs and procedures, is considered hardness-critical, only the task title is marked by the acronym "HCP" before the title.
2. When only certain processes and steps within the work package are hardness-critical, only the applicable process and steps are marked by the acronym "HCP" between each applicable step number and the text.

PARTS INFORMATION FOR REPAIR PARTS, SPECIAL TOOLS, TMDE AND SUPPORT EQUIPMENT

Repair parts are listed and illustrated in parts information work packages WP 0111 through WP 0126 of this manual. Maintenance Allocation Chart (MAC) is in WP 0132.

END OF WORK PACKAGE

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION
HP-2C/185
EQUIPMENT DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The HP-2C/185 (Figure 1) is comprised of a trailer, an Environmental Control Unit (ECU) and a Genset.

The ECU provides heating and cooling to a shelter. The Genset is designed primarily to power the ECU and secondarily to power shelter's lighting and utility outlets for operating AC electric devices. The HP-2C/185 is designed for mobility and can be towed by a vehicle capable of pulling 4,200 lbs. The HP-2C/185 is transportable by vehicle, air, rail, or sea and can be loaded by crane and transported by aircraft.

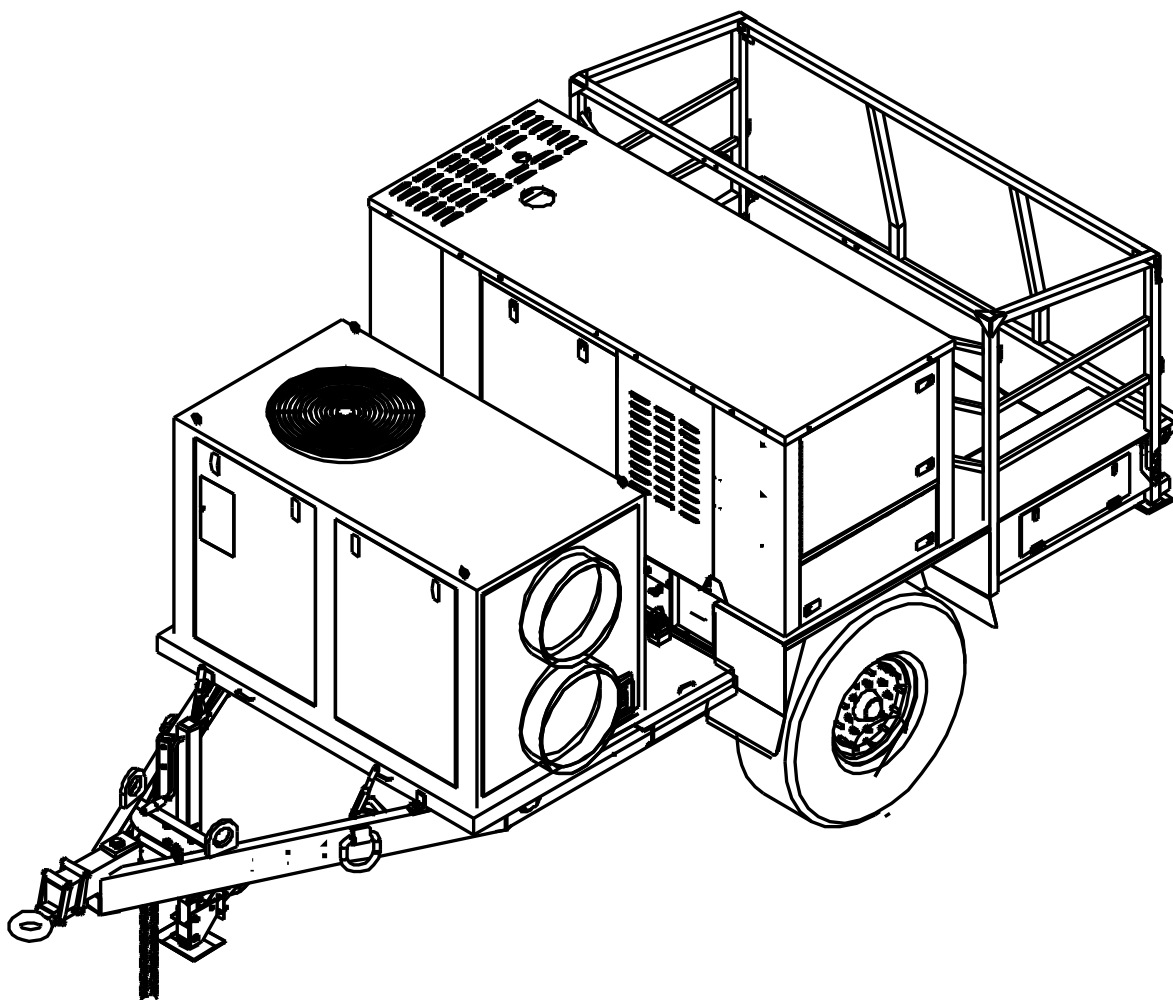


Figure 1. HP-2C/185 Configuration.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

HP-2C/185 Trailer

The HP-2C/185 trailer (Figure 2) consists of one 18 kW, 120/208 VAC, 3-Phase, 60 Hz, diesel engine Genset and one 60,000 BTU/hour ECU mounted on a trailer chassis. All HP-2C/185 accessories are added as cargo. A vehicle capable of pulling 4,200 lbs. can tow the trailer. The on-board Genset meets the noise requirements for Tactically Quiet Generators.

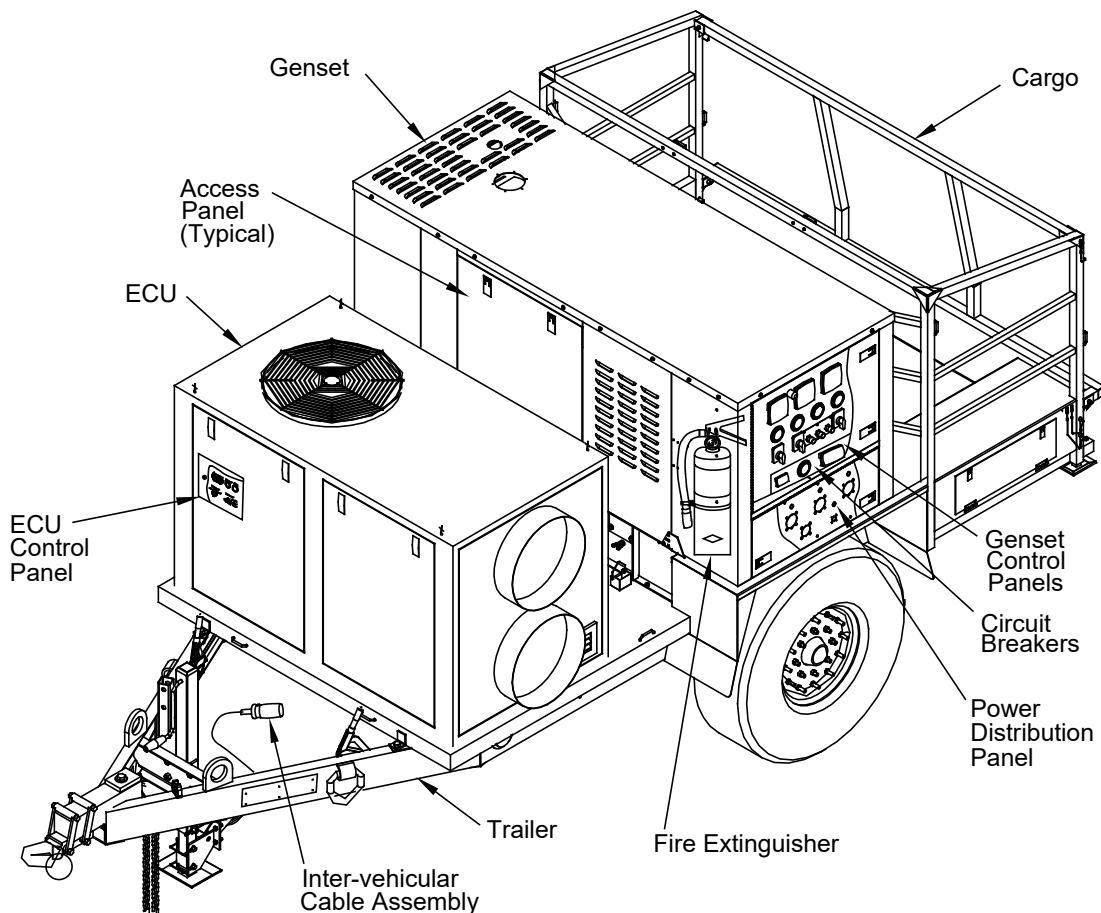


Figure 2. HP-2C/185 Trailer Major Components.

HP-2C/185 Genset

The 18 kW Genset (Figure 3) consists of a four cylinder, liquid-cooled, 1,800 RPM, diesel engine coupled to a single bearing, four-pole generator. The engine's fuel is supplied from an in-chassis fuel tank. The Genset is intended primarily to provide electric power to the ECU which in turn provides conditioned air (hot or cold) to the shelter. The Genset can provide three main levels of output power:

1. The ECU draws near-maximum electric power from the Genset (approximately 18kW) when operating in high heat mode. In this mode, there is only enough remaining electric power from the Genset for shelter lighting (no BFA computers or peripheral equipment).
2. The ECU draws approximately 9kW of electric power (about one half max power) from the Genset when operating in low heat or Air Conditioning (AC) mode. In either of these modes, there is approximately 9kW electric power available from the Genset for shelter lighting and BFA computers and peripheral equipment.
3. The ECU draws no power from the Genset when it is not operating and the maximum 18kW of electric power is available for secondary use.

NOTE

The Genset should not be operating when there is no electric load on it.

The Genset is housed in a weatherproof, acoustically insulated, aluminum enclosure. The enclosure contains the Genset Control Panel, Power Distribution Panel, Circuit Breaker Panel, and Fuel Control Panel. Two 12 VDC, non-spill able, maintenance-free batteries are used to operate the Genset.

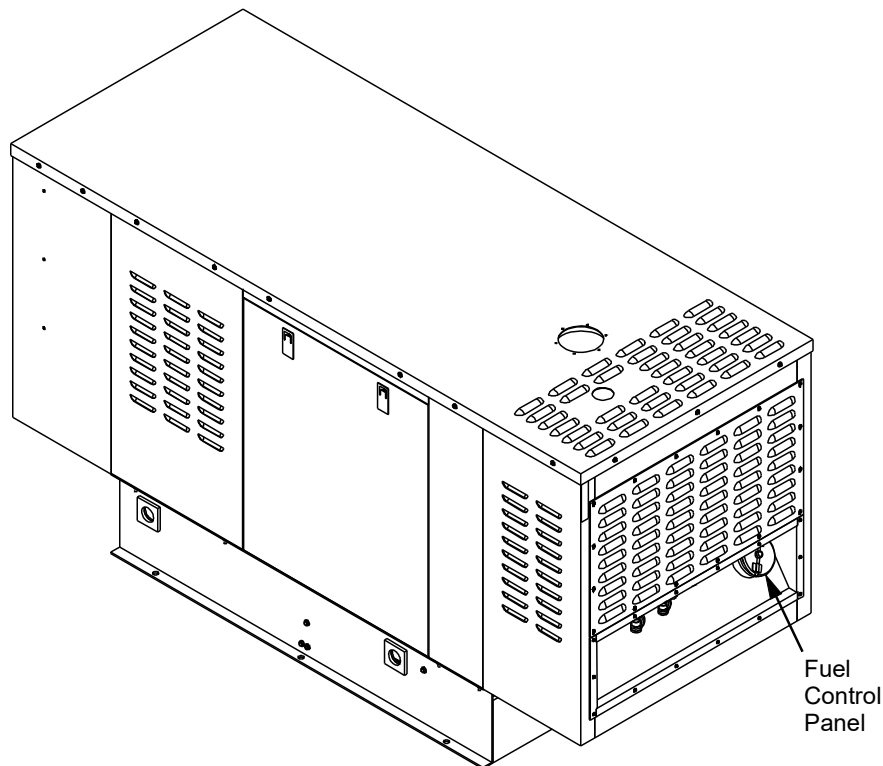


Figure 3. HP-2C/185 Genset.

HP-2C/185 ECU

The ECU (Figure 4) provides 60,000 BTU/hour (5 tons) of cooling at 131°F (ambient air temperature) or 18 kW of electrical heating. The ECU is designed to provide heating or cooling of the enclosed space created by deployed shelters over an ambient temperature range of -50°F to 131°F. The HP-2C/185 ECU has an additional fuel-fired coolant heater that adds up to 17,000 BTU of heat capability for cold weather environments.

The ECU features a MODE SELECT switch which has five settings (HEAT HIGH 18 kW, HEAT LOW 9 kW, OFF, FAN and COOL). In HEAT HIGH mode, the ECU draws near maximum power (18kW) from the Genset leaving very little power available for other operations such as laptops or communications equipment. When utilizing the HEAT LOW 9 kW setting, the Genset has 9kW of power available for other operations such as laptops or communications equipment.

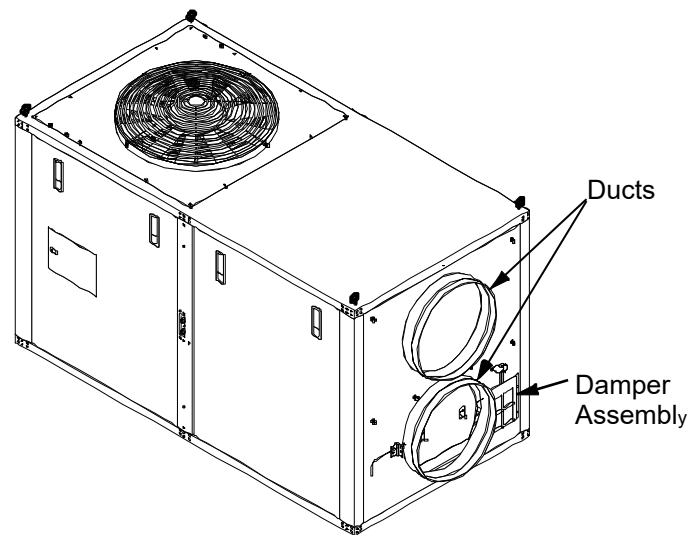


Figure 4. Environmental Control Unit.

HP-2C/185 Cargo Bay

The cargo bay (Figure 5) provides 77 cubic feet of storage space for carrying a shelter and its accessories. All cargo is held in place during transit by a webbed cargo net.

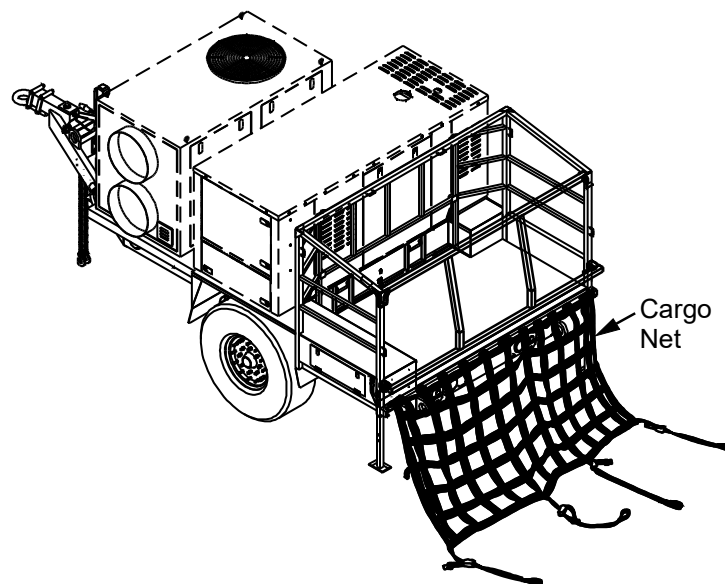


Figure 5. HP-2C/185 Cargo Bay.

HP-2C/185 Chassis

The HP-2C/185 trailer chassis (Figure 6) provides a sturdy mobile platform for the ECU and Genset to be mounted, operated, and transported on. The cargo bay provides ample area for storage and transportation of a soft walled shelter, a PDU, lighting, and air ducts. There is one storage compartment for tools and auxiliary equipment. An adjustable tongue jack is provided to raise and lower the tow ring (lunette) to pintle height and to level the trailer.

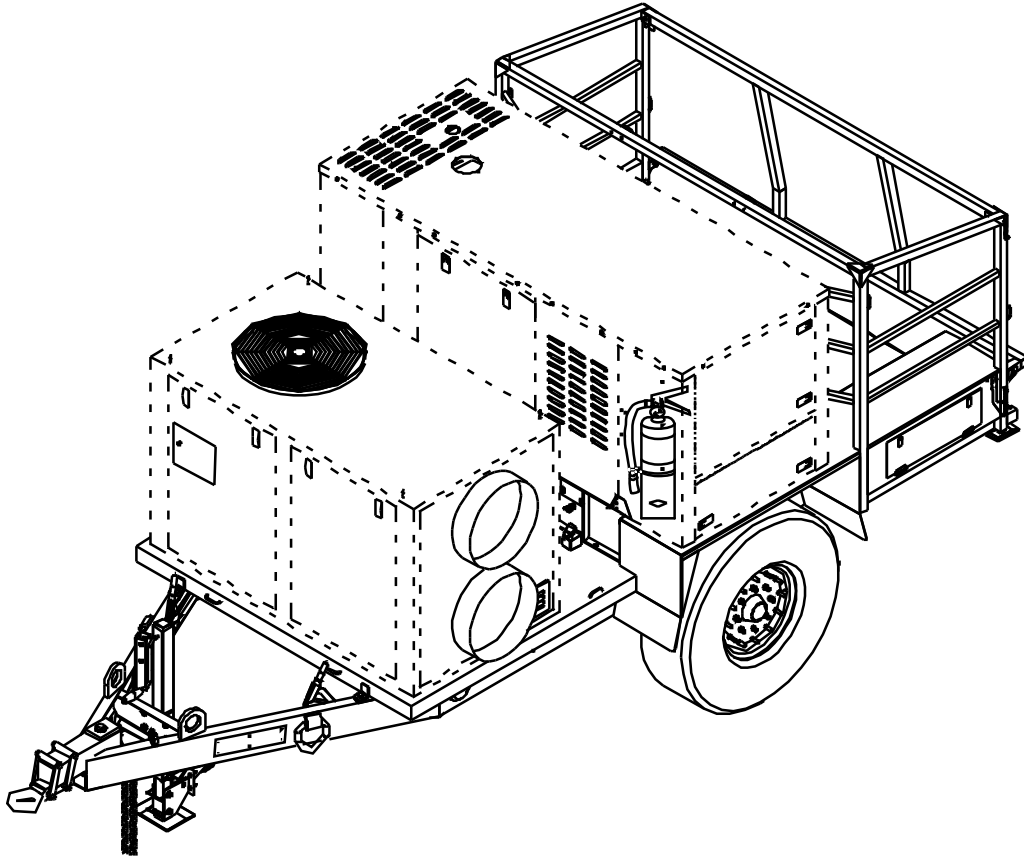


Figure 6. HP-2C/185 Chassis.

DIFFERENCES BETWEEN MODELS

There are two HP-2C/185 systems:

- Utility Service Trailer, Part Number T2-80155G, GREEN, is a green trailer.
- Utility Service Trailer, Part Number T2-80155T, TAN, is a tan trailer.

The Model differences have no effect on operation or maintenance functions. The Model/Series information for the HP-2C/185 trailer is found on the trailer data plate which is located on the roadside of the trailer on the trailer tongue.

EQUIPMENT DATA**Trailer Specifications**

Specifications:	
Dimensions	191" L x 85" W x 77.5" H (4.85 m L x 2.16 m W x 1.97 m H)
Wheel Track	72" (1.83 m)
Ground Clearance	
Unloaded	18" (0.46 m)
Loaded (Combat Load)	16" (0.41 m)
Tow Ring (Lunette) Nominal Height	28" (0.71 m)
Weights: (Maximum)	
Tare	3,500 lb (1,588 kg)
Gross	4,200 lb (1905 kg)
Tongue (loaded with cargo)	420 lb (190.5 kg)
Cargo Area	41" D x 81" W x 45.5" H (1.04 m D x 2.06 m W x 1.16 m H)
Cargo Area Capacity	76 ft3 (2.4 m3)
Noise Level (at 3 feet from the control panel)	
with the ECU Off	68.2 dBA
with the ECU On	75.9 dBA
Electrical System	24 VDC
Brakes	
Primary	Hydraulic surge brake with automatic breakaway actuator
Secondary	Two independent, lever-operated mechanical parking brakes
Axle	Single
Suspension	Torflex suspension rated at 6,000 lb
Tires	
Size	Two 37 x 12.50 x 16.5 LT
Load Rating	D, bias ply
Type	Goodyear R/T II, run-flat
Inflation	20 psi (highway)/17 psi (off road)
Fuel Tank	16-gallon capacity, baffled
Maximum Speed when Towing Vehicles	55 MPH

Genset Specifications

Specifications:

Dimensions.....	84" L x 34" W x 45.5" H (2.13 m L x .86 m W x 1.15 m H)
Weight	1350 lbs. (612.35 kg)
Engine	Four-cylinder, liquid-cooled, direct injection, 1800 RPM, diesel
Ambient Temp	
Min.....	-50°F (-46°C)
Max.....	140°F (+60°C)
Fuel	
Type.....	Diesel, JP8
Consumption	1¼ gal/hr @ full load
Battery Capacity	24 VDC
Lubricating Oil	Capacity 8.6 qt. (8.13 liter)
Coolant	Capacity 3.1 gal. (11.73 liter)
Generator	Four-pole, single bearing generator rated for 18 kW at 125°F providing 120/208 VAC, 60 Hz, 3Ø power
Power Distribution Panel	
120 VAC, 20 A, 1 phase receptacle	2 ea
208 VAC, 60 A, 3 phase.....	2 ea
120 VAC, 4 A, battery charger receptacle.....	1 ea
24 VDC NATO/slave receptacle.....	1 ea

ECU Specifications

Specifications:

Dimensions	64.9" L x 33.8" W x 38.3" H (1.6 m L x 0.86 m W x 0.97 m H)
Weight	520 lbs. (235.86 kg)
Voltage / Phase / Hertz	208 VAC / 3Ø / 60 Hz
24 VDC NATO/slave receptacle	1 ea
Minimum Power Factor	0.90
Maximum Power Draw	18 kW
Cooling output	60,000 BTU/hr at 125°F
Heating output	60,000 BTU/hr electric heat 17,000 BTU fuel-fired auxiliary heater
Minimum Cooling Capacity	60,000 BTU/Hr
Ducts	16" (.41 m) dia (supply and return)
Rated Ambient Temperature	125°F (51.66°C)
Ambient Temperature (Cooling)	
Maximum	131°F (55.0°C)
Minimum	40°F (4.44°C)
Ambient Temperature (Heating) Minimum	-50°F (-45.55°C)
Air Flow	2400 CFM
Minimum Fresh Air Supply	280 SCFM

END OF WORK PACKAGE

GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION
HP-2C/185 UST Trailer
THEORY OF OPERATION

18kW Generator Set

The 18 kW Generator Set consists of a four cylinder, liquid-cooled, 1800 RPM, Diesel engine coupled to a single bearing, four-pole generator. The engine's fuel is supplied from the in-chassis fuel tank. The Genset is housed in a weatherproof, acoustically insulated, aluminum enclosure. The enclosure also contains the Genset Control Panel, Power Distribution Panel, and two 12 VDC, non-spillable, maintenance-free batteries suitable for 24 VDC engine starting. The Genset is intended primarily to power the ECU and secondarily to power shelter lighting and utility outlets for operating AC electric devices.

5-Ton ECU

The ECU, which operates off of 208 VAC, 3 Ø, 60 Hz, provides 60,000 BTU/hour (5 tons) of cooled air or 60,000 BTU/hr of heated air. The ECU has an auxiliary fuel-fired heater that provides an additional 17,000 BTU/hr hot air output for cold weather climates. Heat output can be regulated manually or by auto returned air flow and temperature. A selector switch determines the mode of operation. Airflow is directed to and returned from the shelter by way of insulated air ducts. The ECU is housed in a weatherproof, aluminum enclosure that may be removed from the trailer and operated independent of the HP-2C/185 UST Trailer (requires an external power source).

HP-2C Chassis

The HP-2C/185 UST Trailer chassis consists of a six-inch structural steel frame with four tie-down rings and an aluminum upper structure. The chassis is equipped with a hydraulic surge brake system, two hand-operated parking brakes, two HMMWV standard tires, and a 16-gallon, in-chassis baffled fuel tank, fitted with a four-inch diameter filler and a fuel level indicator. Two 24 VDC tail light assemblies are wired to a 12-pin plug for connecting to the towing vehicle receptacle. An adjustable tongue jack is provided to raise and lower the tow ring (lunette) to pintle height and to level the trailer. A storage post for attaching the dolly wheel/skid plate assembly during towing is provided adjacent to the jack. There is one storage compartment for tools and auxiliary equipment.

GENSET**NOTE**

Refer to (Figures FO-6 to FO-11) for schematics of the Genset and its associated electronic components.

Fault System

The fault system (Figure 1) protects the generator set against potential faults described below and provides an indication of any incurred fault. The following summary of the fault system will assist in understanding the operation of the generator set. Additional details relating to specific protection devices are provided in the descriptions of the respective systems. The fault system consists of the following:

- Three malfunction indicators
- High temperature switch and relay (K4)
- Over speed switch and relay (K5)
- Low oil pressure switch and relay (K6)
- Governor control relay (K7) with time delay circuit
- BATTLE SHORT switch

Activation of the over temperature switch, over speed switch, or low oil pressure switch will cause it's respective relay to energize. Each relay has a normally closed and normally open contact. The normally closed contact of the relay opens disconnecting the 24 VDC supply to the governor controller and the fuel pump resulting in generator shutdown. The normally open contact closes illuminating the relay's fault indicator lamp which is located on the control panel.

High Temperature switch (HTS) - activates when the engine coolant leaving the engine exceeds 220 °F.

Over Speed Switch (SS) – activates when the engine speed exceeds 1900 rpm (approximately 64 Hz).

Low Oil Pressure Switch (LOPS) – activates when engine oil pressure drops below 20 psi.

The governor bypass relay (K7) has a four second Time Delay Relay (TDR) in its circuit. The time delay causes the (K7) relay to bypass the high temperature relay (K4) and low oil pressure relay (K6) until the engine starts. The (K7) relay also disconnects the alternator trigger until the four second delay completes.

To reset an activated fault indicator lamp the ENGINE selector switch needs to be set to OFF then the system can be restarted to verify the malfunction has been corrected.

The BATTLE SHORT Switch can be activated before the generator set is started to bypass the fault protection circuits and provide 24 VDC to the governor control module and fuel pump regardless of the malfunction.

Fault System – Continued

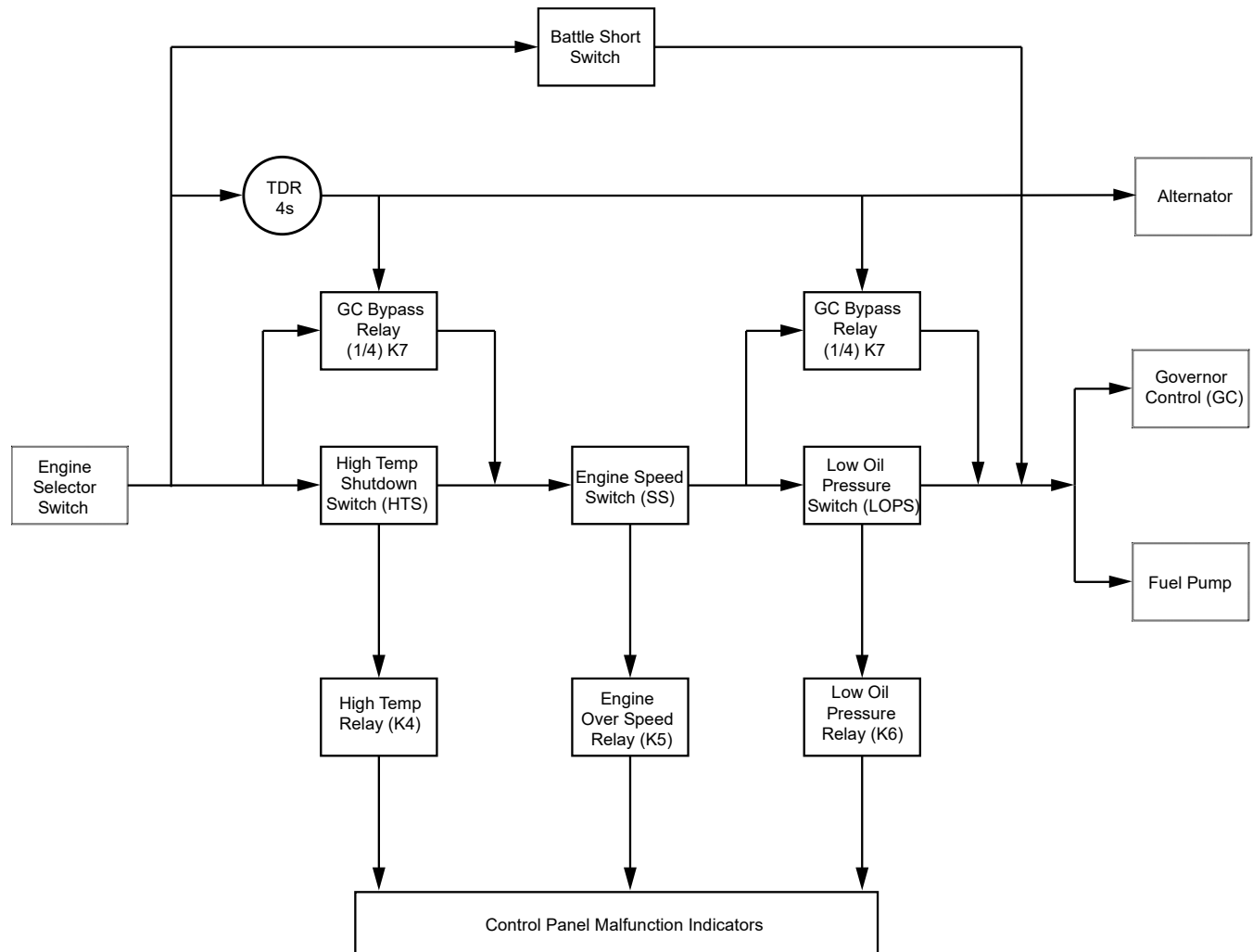


Figure 1. Genset Fault System.

Fuel System

NOTE

Refer to (Figure FO-12) a schematic of the Engine (hydronic) Heater.

The Fuel System is comprised of the engine fuel subsystem which provides fuel to the engine and a heater fuel subsystem for the engines hydronic heater. An auxiliary fuel source, such as a 55 gallon drum of diesel, can be used to supplement the fuel tank. The Fuel System (Figure 2) is comprised of the following components:

- Standard float type fuel gauge
- Fuel tank with source and return lines
- Auxiliary fuel line with return line
- In-line fuel heater
- Engine and hydronic heater fuel filters
- Two fuel pumps
- Four injector pumps
- Four fuel injectors
- Hydronic engine heater

With the ENGINE Selector Switch (SW3) set to START or RUN the fuel transfer pump is powered and draws fuel from the fuel tank. After fuel reaches the injector pumps it is pressurized and forced into the fuel injectors. The fuel is then sprayed by the injectors into the engine combustion chamber where it's mixed with air and ignited. The fuel that is not burned by the engine is returned to the fuel tank by an excess fuel return line. With the engine running, the electrical governor controller adjusts the mechanical governor to maintain a steady metered flow of fuel to the injection pumps. The EMERGENCY STOP button (SW7), located on the generator set circuit breaker panel, can immediately shutdown the engine by causing the mechanical governor to halt fuel flow at the fuel injector pump.

The in-line fuel heater is used for cold temperature operation. The FUEL LINE HEATER Switch (SW8), located on the control panel, when actuated, ensures that the diesel fuel does not jell and clog the fuel filters. The in-line fuel heater is a separate, battery-powered heater that is wrapped around the fuel lines to heat the fuel before it reaches the engine and hydronic heater.

When the ENGINE HEATER Switch (SW6) is actuated, the hydronic heater fuel pump draws fuel from the fuel tank. The fuel is converted to heat, raising the engine coolant above freezing in low temperature environments.

The four switches SW3, SW6, SW7, and SW8 provide the 24 VDC control logic and power needed to operate the engine heater, fuel line heater, fuel pumps, and fuel injector pumps.

Fuel System – Continued

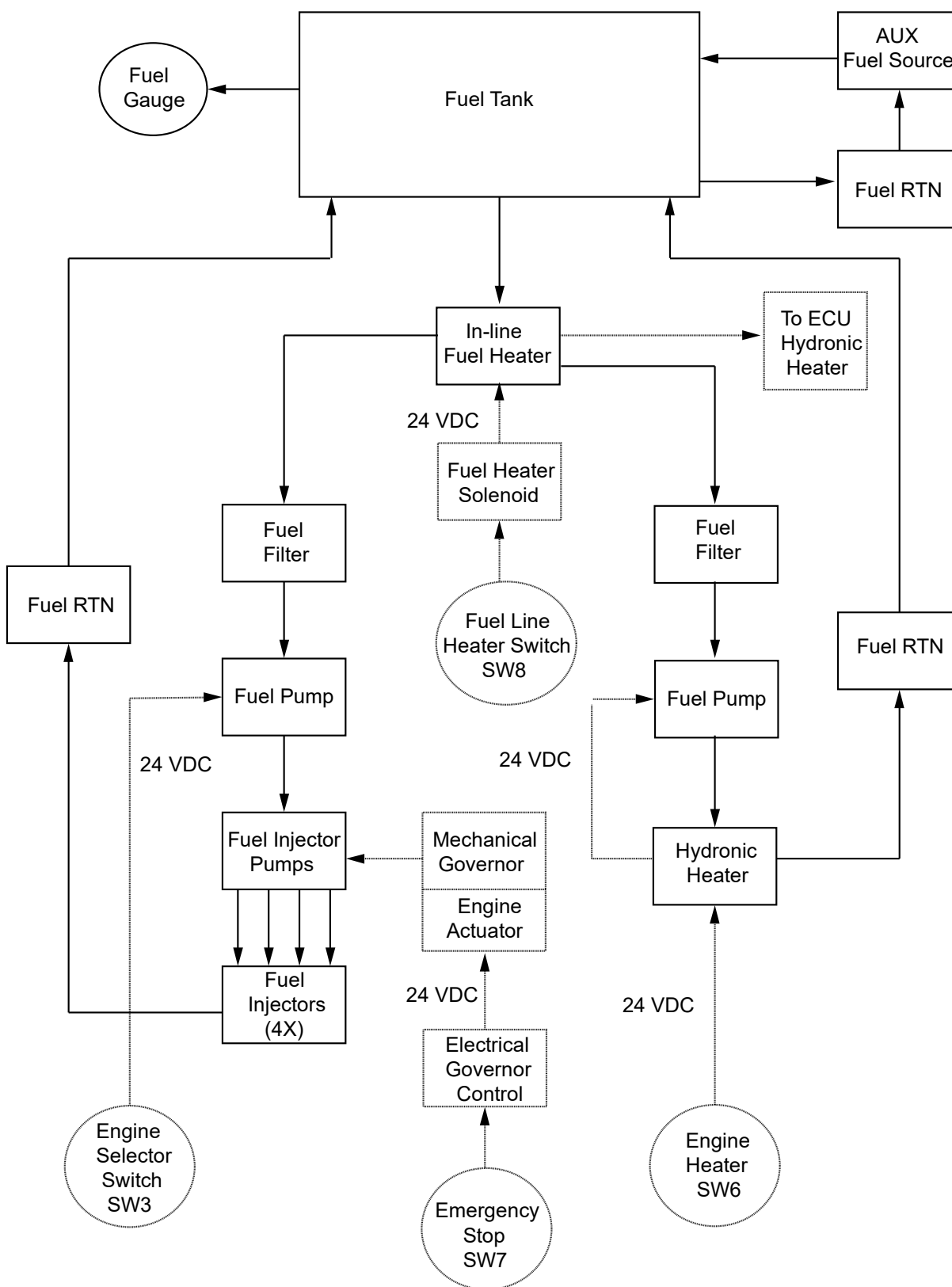


Figure 2. Fuel System.

Engine Heater System**NOTE**

Refer to (Figure FO-12) a schematic of the Engine (hydronic) Heater.

The engine heater (Figure 3, Item 1) is a diesel fueled internal combustion heater that heats the cooling system fluid and circulates this fluid through the battery heater tray (Figure 3, Item 2), through the water pump housing (Figure 3, Item 3) and into the engine block (Figure 3, Item 4). The heated fluid exits at the rear of the engine block (Figure 3, Item 4) into a mechanically operated thermostat shutoff housing (Figure 3, Item 5) before returning to the engine heater (Figure 3, Item 1).

The thermostat shutoff (Figure 3, Item 5) operates in an opposite fashion as the engine coolant thermostat. A common engine coolant thermostat is spring loaded and is in the closed position until the engine reaches a certain temperature at which time the spring opens and allows the coolant to flow from the water pump (Figure 3, Item 3) to the engine block (Figure 3, Item 4). The engine heater thermostat is spring loaded and is normally in the open position so that coolant can flow when the engine is cold. Once the engine coolant temperature rises to a preset temperature, the spring closes and prevents any more fluid from circulating through the engine heater circuit.

The engine block (hydronic) heater has its own built in fault system. A flashing light indicates a fault. Refer to (Table 2 of WP 0011) for indicator fault code.

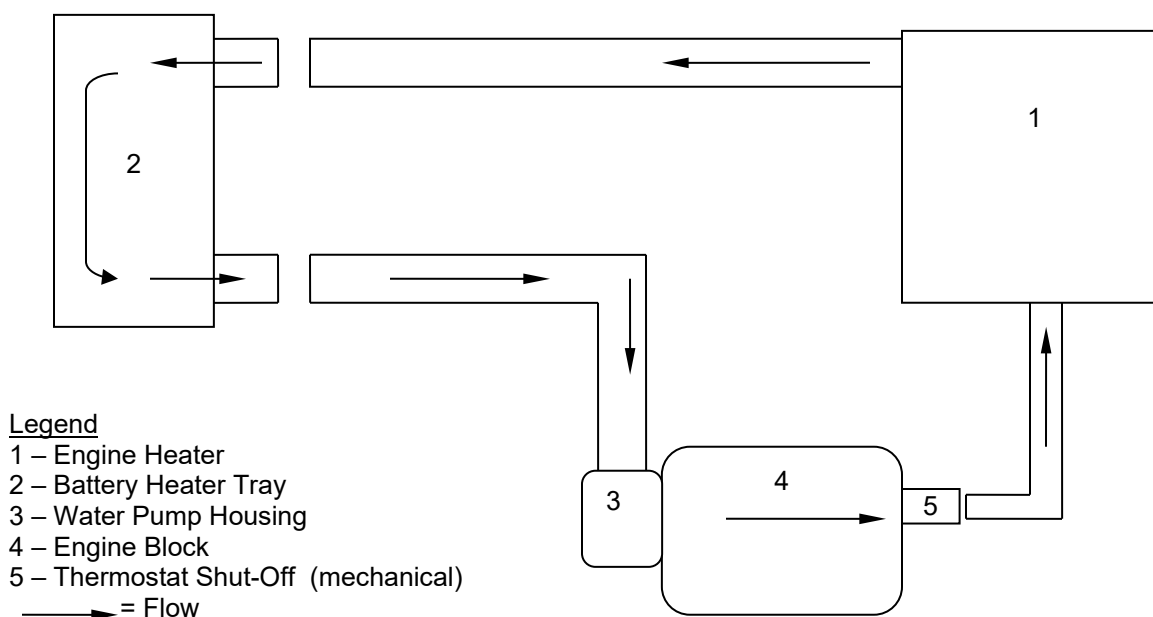


Figure 3. Engine Heater Flow Diagram.

The Fuel Line Heater is a separate, battery-powered heater that is wrapped around the fuel lines to heat the fuel before it reaches the engine.

Engine Cooling System

The Engine Cooling System (Figure 4) consists of the following components:

- Radiator
- Thermostat
- Temperature sender
- COOLANT TEMP meter
- Water pump
- Belt driven radiator fan
- Cooling jackets (part of engine)
- Coolant high temperature switch
- Cutoff valve

The water pump forces the coolant through passages (cooling jackets) in the engine block and cylinder head where the coolant absorbs heat from the engine. When the engine reaches normal operating temperature, the thermostat opens and the heated coolant flows through the upper radiator hose assembly to the radiator. The cooling fan circulates air through the radiator where the coolant temperature is reduced. A coolant high temperature switch in conjunction with the fault system provides automatic fault shutdown in the event the coolant temperature exceeds 180 +/- 3°F (82 +/- 2°C). The COOLANT TEMP meter indicates the engine coolant temperature, from 100°F to 240°F (38°C to 115°C). When the engine is cold, coolant is also routed through a cutoff valve to the heater. The coolant passes from the heater to the battery mounting plate and back into the engine block. The cutoff valve is set to close when the coolant temperature exceeds 100°F (38°C).

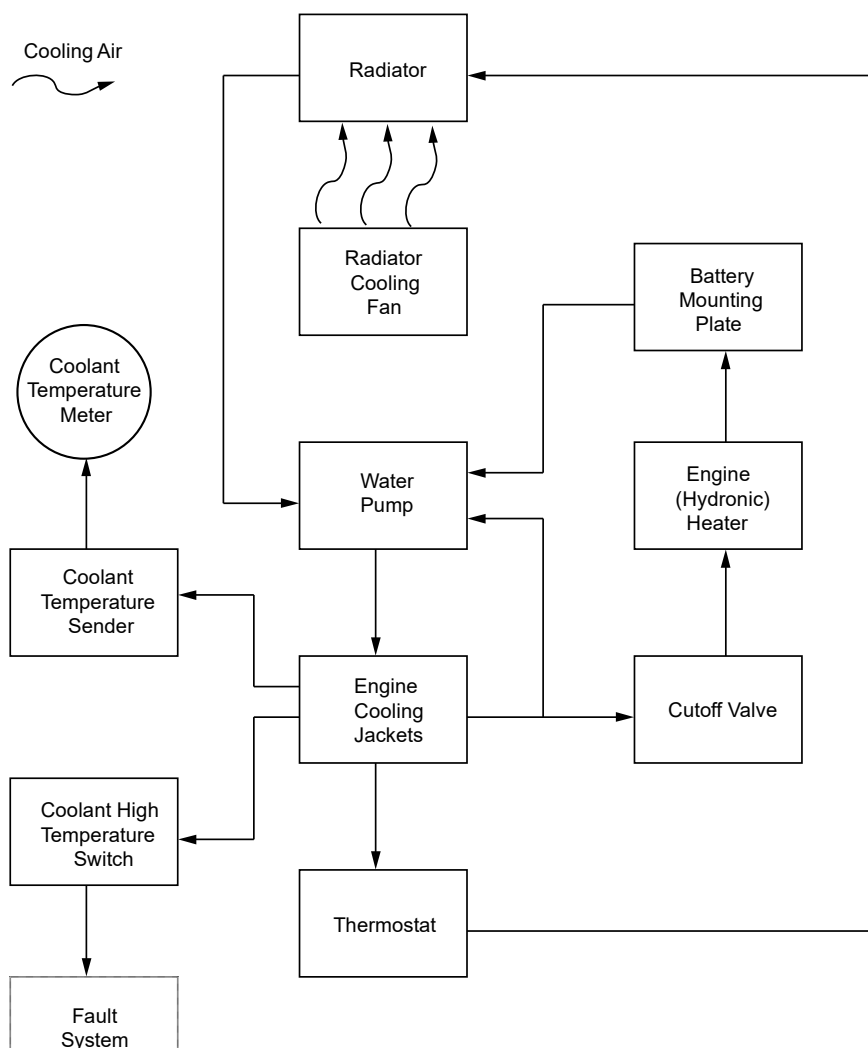


Figure 4. Engine Coolant System.

Engine Lubrication System

The Engine Lubrication System (Figure 5) consists of an oil sump, dipstick, oil pump, pressure relief valve, oil pressure sender, OIL PRESSURE meter, low oil pressure switch, and filter. The oil sump is a reservoir for engine lubricating oil. The dipstick indicates oil level in the sump. The oil level can only be checked when the engine is not running. The pump draws oil from the sump through a strainer removing large impurities. A pressure relief valve monitors oil pressure and shunts oil back into the sump to help relieve pressures in excess of 63.81 psi (440 kPa). The oil then passes through a spin-on type filter where small impurities are removed. From the filter, oil is distributed to the engine's internal moving parts and returns to the oil sump. The oil pressure sender located in the engine crankcase senses oil pressure. The oil pressure is displayed on the OIL PRESSURE Meter. The low oil pressure switch, also located in the engine crankcase, functions with the generator set fault system. The engine is automatically shut off if the oil pressure drops below 20 psi (138 kPa).

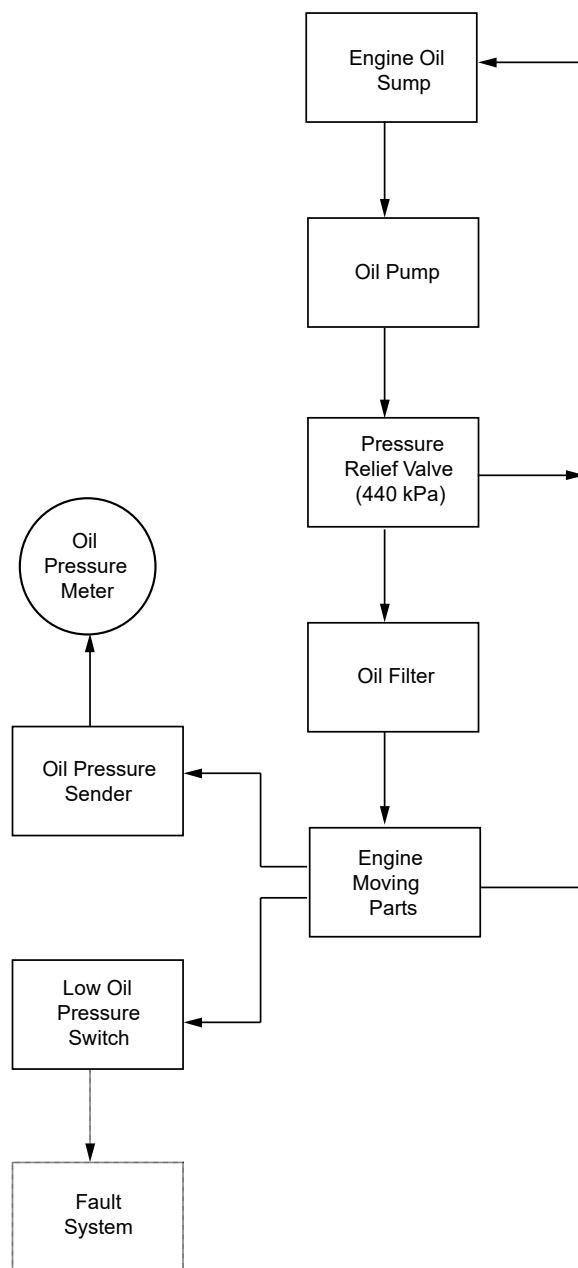


Figure 5. Engine Lubrication System.

Power Generation/Supply System

The Power Generation/Supply System (Figure 6) consists of the following components:

- AC generator
- AC generator junction box
- Generator circuit breaker CB5 GEN
- Fuse bank
- VOLTAGE/AMMETER switch for monitoring individual phases
- Ammeter, voltmeter, frequency meter, and watts meter
- Load distribution terminal blocks
- Load output circuit breakers
- Power distribution connectors

Power (208 VAC, 3Ø, 60 Hz, 60 A) created by the AC generator is routed through a junction box to the main load disconnect circuit breaker CB5 GEN. The switched 3 phase power from CB5 GEN is then routed to voltage blocks L1 (black), L2 (red), and L3 (blue). The generators un-switched neutral and ground lines are routed directly from the junction box to their respective terminal blocks. The terminal blocks act as a load distribution point. Power is then distributed through circuit breakers CB1 J1, CB2 J2, CB3 J3, and CB4 J4 to interface load connectors J1, J2, J3, and J4.

The CB5 GEN circuit breaker enables or interrupts the power to the load terminal blocks. The power is monitored at the load side of the circuit breaker. Power from phase legs L1, L2, and L3 is passed through fuses F1, F2, and F3 to the VOLT/AMP switch SW1. The SW1 switch transfers individual phases for monitoring on control panel meters A-C AMPERES, HERTZ, and A-C VOLTS. Current transformers are used to sense the power flow through the load side of CB5 GEN. The current transformers are used by a watts transducer which computes power usage and displays it on the A-C KILOWATTS meter.

The AC generator voltage output is sensed by the voltage regulator circuit. The voltage regulator maintains the generator output voltage by providing a DC control signal to the field terminals of the exciter. The AC generator frequency is controlled by the governor control system, sensed by the frequency transducer and is read on the HERTZ frequency meter. The circuit breakers in the circuit breaker panel disconnect the load whenever an overload or short circuit exists. The critical operating parameters of the engine are monitored by the fault system which shuts down the engine when a fault occurs and stops power generation.

Power Generation System - Continued

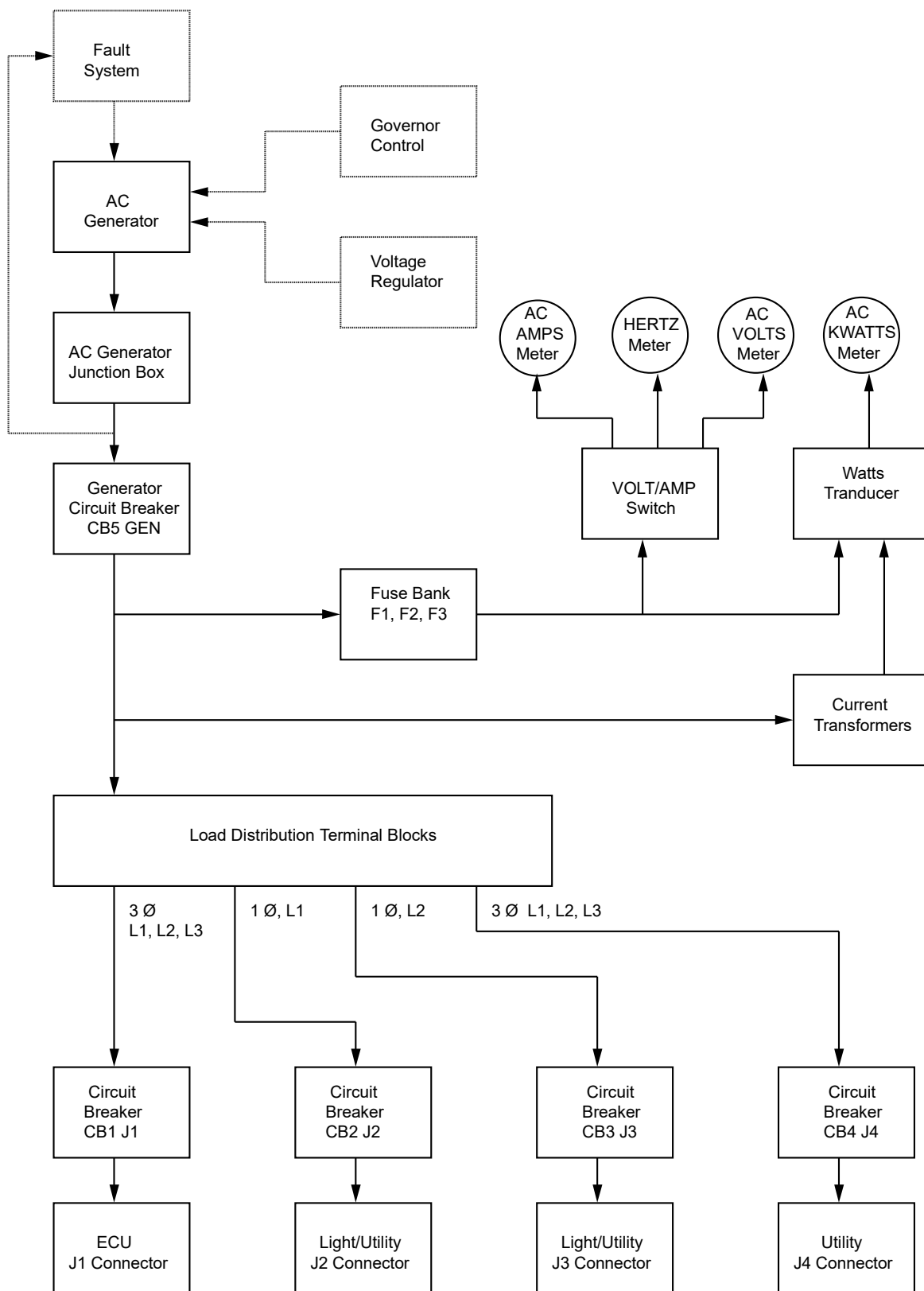


Figure 6. Output Supply System.

Barrier Panel

The barrier panel (Figure 7) is located behind the control panel and power distribution panel on the Genset. It contains the electronic components used to control, regulate, and distribute the power generated by the Genset. The barrier panel components consist of:

- Watt Transducer
- Fuses
- Relays (K4-K7)
- Voltage Regulator
- Speed Sensor
- Precision Governor
- Circuit Breakers (CB1 through CB5)
- Battery Charger
- Current Transformers
- Terminal Blocks

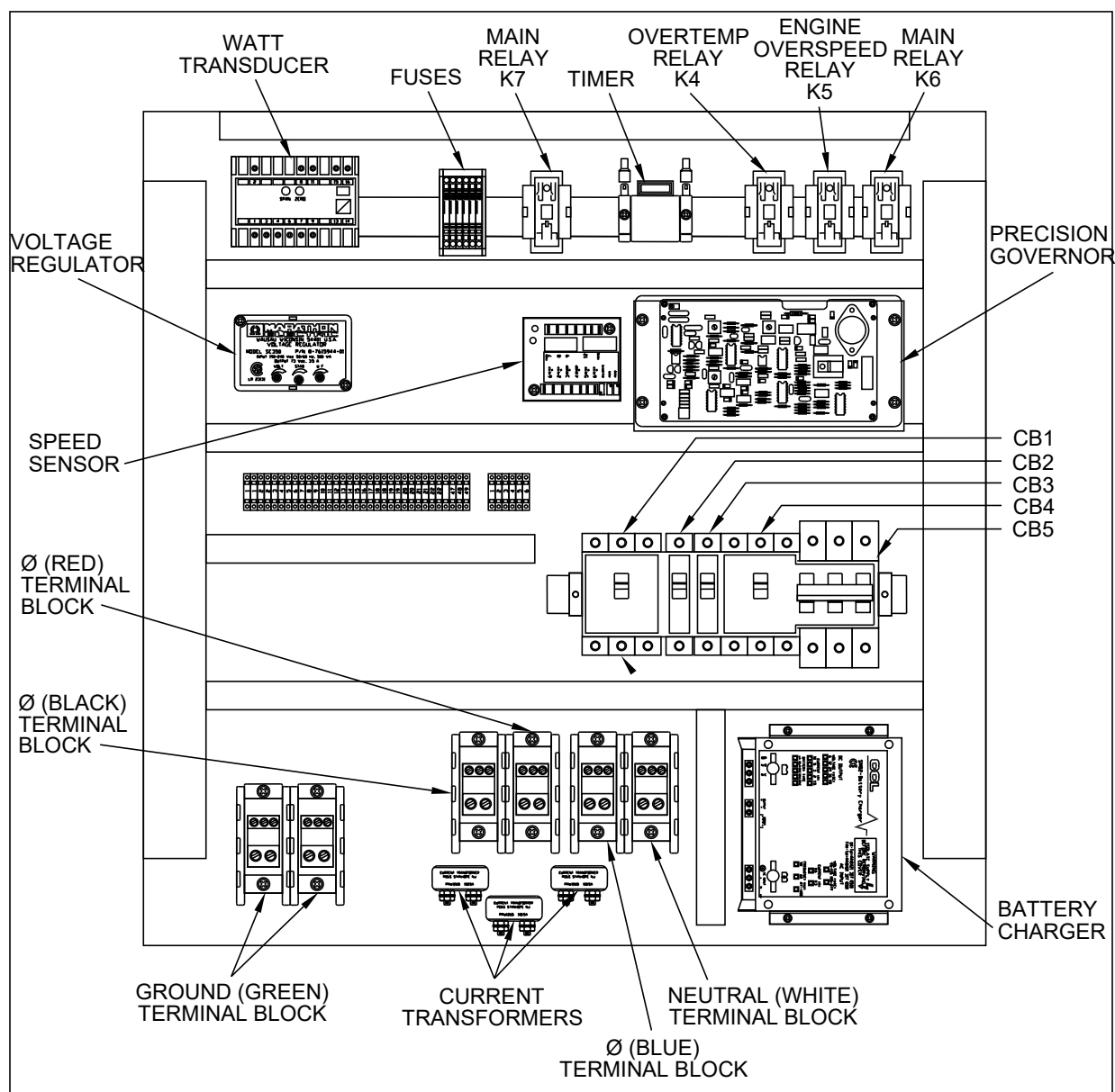


Figure 7. Barrier Panel Component Location.

Governor Control System

The Governor Control System (Figure 8) consists of an electronic precision governor controller, electronic speed switch, a speed sensor, electronic actuator control unit, mechanical governor, and emergency stop switch. The speed sensor is a magnetic pickup coil. It registers the speed of the engine, which is typically 1800 rpm, as the flywheel teeth pass within the field of the pickup coil. The speed sensor signal is monitored by an engine speed switch. The signal is also used by the governor controller in a feedback control loop to regulate engine speed. The governor controller regulates speed with a control signal applied to the actuator control unit. The electro-mechanical actuator adjusts the control linkage to the injection fuel pump system in response to the governor control signal. The EMERGENCY STOP switch, located on the control panel, shuts down the generator by disconnecting the governor control signal to the actuator control unit, eliminating fuel to the injector pumps.

Voltage Regulation System

The voltage regulator senses 208 VAC between phase legs L1 to L3 of the generator. The control panel VOLTAGE ADJUST potentiometer provides a means to adjust the generator field current, which is 70 amps typically, to maintain the desired 208 VAC output voltage for different loads.

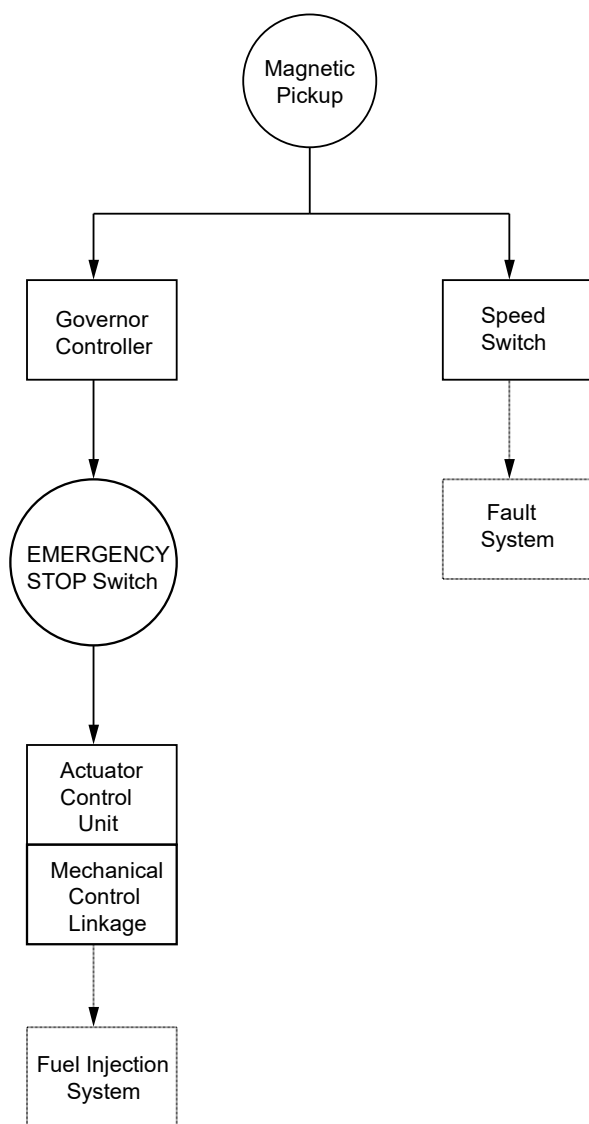


Figure 8. Governor Control System.

Battery Charging System

The battery charging system (Figure 9) consists of the following:

- Circuit breaker CB2 J2
- Indicator lamps J2 and J5
- Fuse F8
- Battery charger
- BATTERY CHARGER AMPS meter
- Two 12 VDC batteries
- External battery charger input connector J5
- NATO/Slave connector J6
- Genset alternator
- Battery Switch

For normal charging conditions the Genset alternator provides a DC charge to the battery. The battery charge is also supplemented by a built-in battery charger when CB2 J2 is actuated. The battery charger current can be monitored on Genset control panel meter BATTERY CHARGE AMPS. The battery can also be charged through the battery charger with the Genset shut down. An external 120 VAC input can be applied to J5 INPUT connector to provide power, thereby preventing battery freeze-up in cold climates. The battery charge can be monitored at control panel meter BATTERY CHARGE AMPS for this condition. For an emergency situation external power can be applied directly to the battery through the NATO/Slave connector J6. The BATTERY SWITCH should be OFF when connecting or disconnecting the input to J6 and ON when charging the battery.

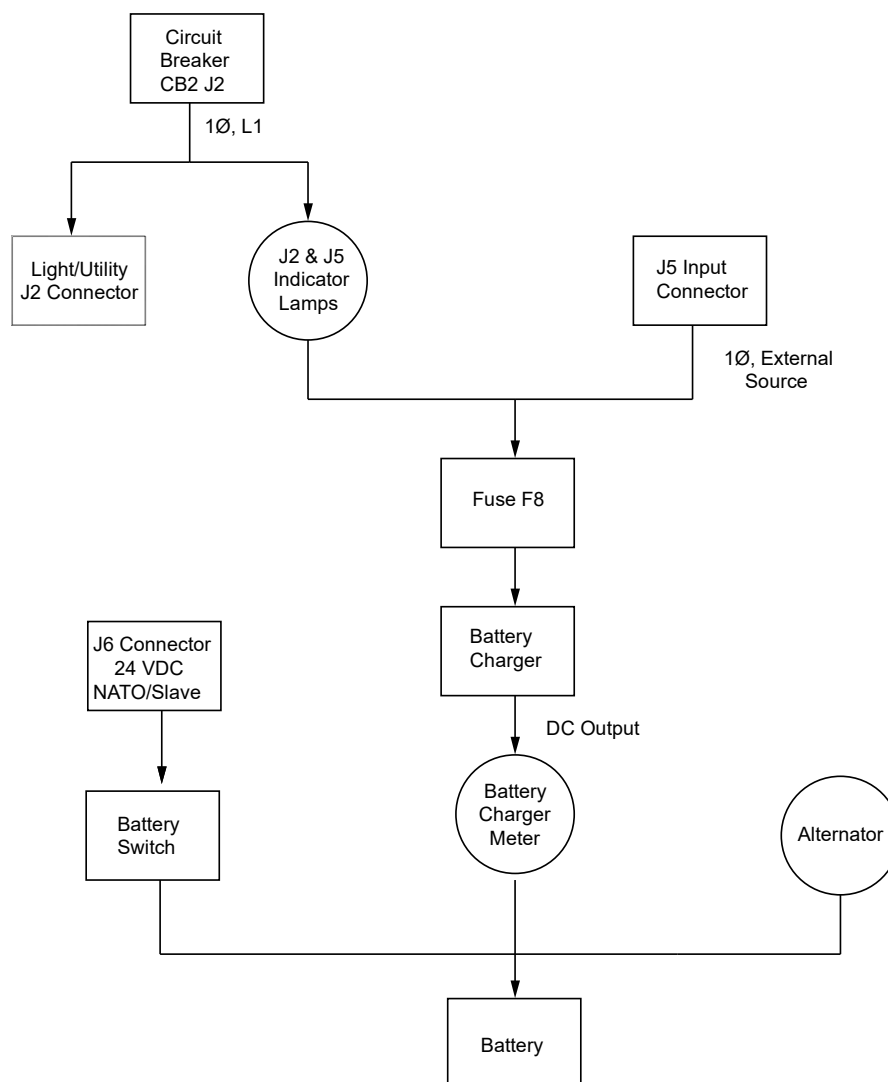


Figure 9. Battery Charging System.

ENVIRONMENTAL CONTROL UNIT

Power Distribution/Fault System

The Power Distribution/Fault System (Figure 10 for Version 1 or Figure 12 for Version 2) distributes power and protects the ECU against potential faults. The following summary of the system and its components will assist in understanding the operation of the ECU in cooling or heating mode. The summary also provides a description of any fault indicators.

The system consists of the following:

- 24 Volt power supply
- Phase sensing relay
- Two motor starter protectors
- Time delay relay
- Heater and compressor contactors
- High temperature cutout
- High and low pressure cutout switches

Refer to (Figure 10 for Version 1 or Figure 12 for Version 2) to locate the system components.

A 24 volt power supply consisting of 208/24 volt step down transformer (TX1) provides a 24 VAC control voltage to the protective relays and fault sensors. The 24 VAC is also converted to 24 VDC by a bridge rectifier (BR) to supply power to the auxiliary heater.

The Phase Sensing Relay (PSR) detects an out of phase condition when incoming power wires are connected in the wrong order. During an out of phase condition, the normally open relay contact remains open removing the 24 VAC control voltage to the contactors and motor starter protectors, disabling the ECU. The normally closed relay remains closed applying 24 VAC to the Out of Phase Indicator (OPL), turning it red.

The Condenser Motor Starter Protector (CMSP) and Evaporator Motor Starter Protector (EMSP) enable the fan motors to draw large turn-on surge current without tripping a circuit breaker. A Time Delay Relay (TDR) turns on the compressor starter 15 seconds before power is applied to the compressor.

The Compressor Contactor (CCR) and Heater Contactor (CHT) apply line voltages to the compressor and heater units. During normal operation the 24 VAC control voltage actuates the contactors. When a fault occurs, large current flows to the motor through the overload heater elements in the contactor. The elements heat up and cause the normally-closed contacts to spring open. This will de-energize the contactor relay and shut off power to the motor. After the contactor heater cools down, it can be reset manually to re-apply power to the motor.

The High Temperature Cutout (HTC) switch is a protective thermostat located in the evaporator enclosure. The HTC acts as a safety to cut off power to the heater coils and blower motor if the temperature in the enclosure exceeds 190 °F. Two causes for excessive temperatures is blockage of airflow through the evaporator enclosure or a fan failure.

The High Pressure Cutout (HPC), located at the discharge side of the compressor protects the high pressure side of the refrigerant system. The HPC switch shuts down the compressor by removing the 24 VAC control signal from the compressor contactor when the pressure exceeds the preset value of the switch. The HPC has a manual reset button.

The Low Pressure Cutout (LPC) is located on the suction side of the compressor. The LPC switch shuts down the compressor by removing the 24 VAC control signal from the compressor contactor when the pressure falls below the preset value of the switch.

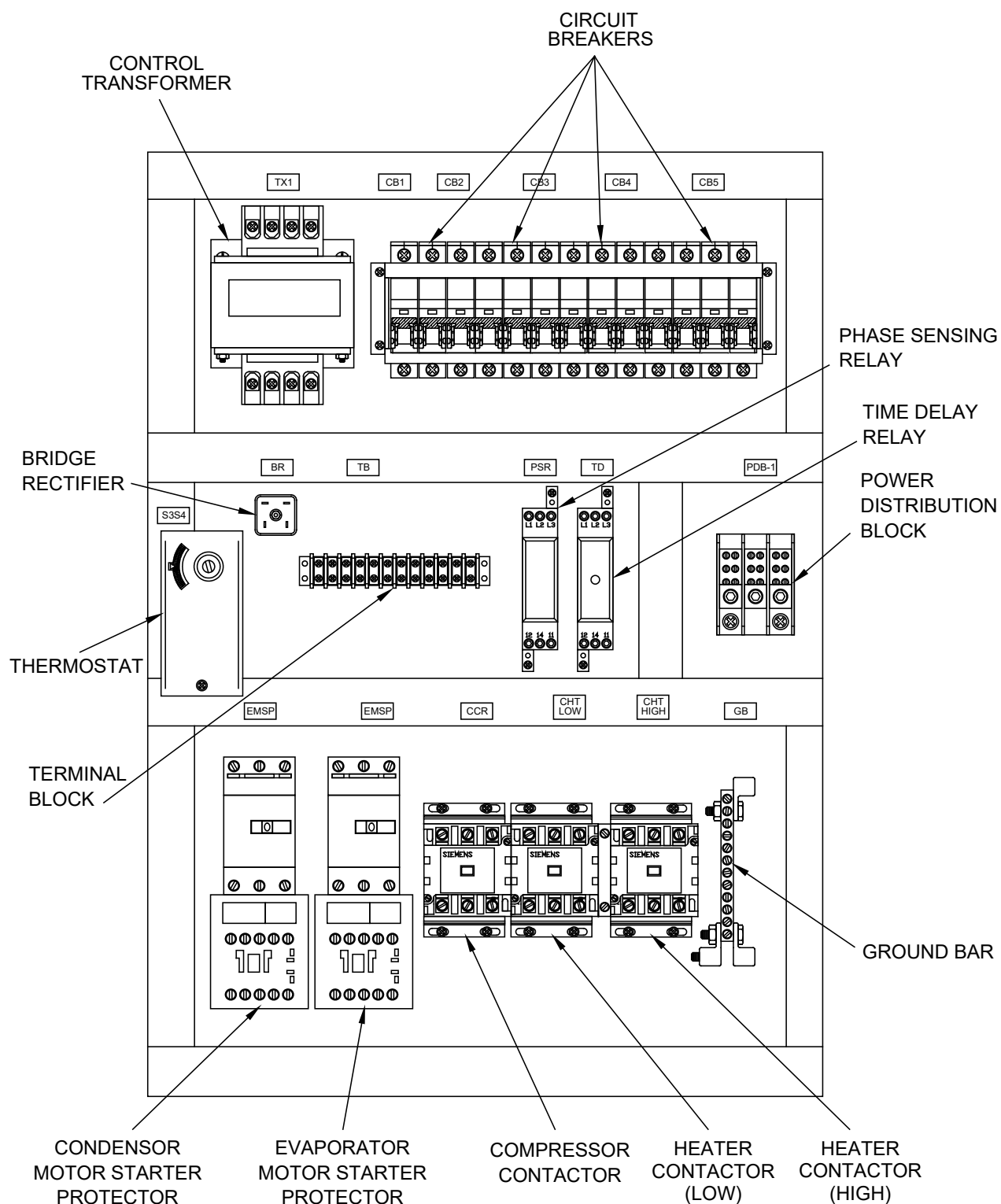


Figure 10. ECU (Version 2) Control Panel Component Location.

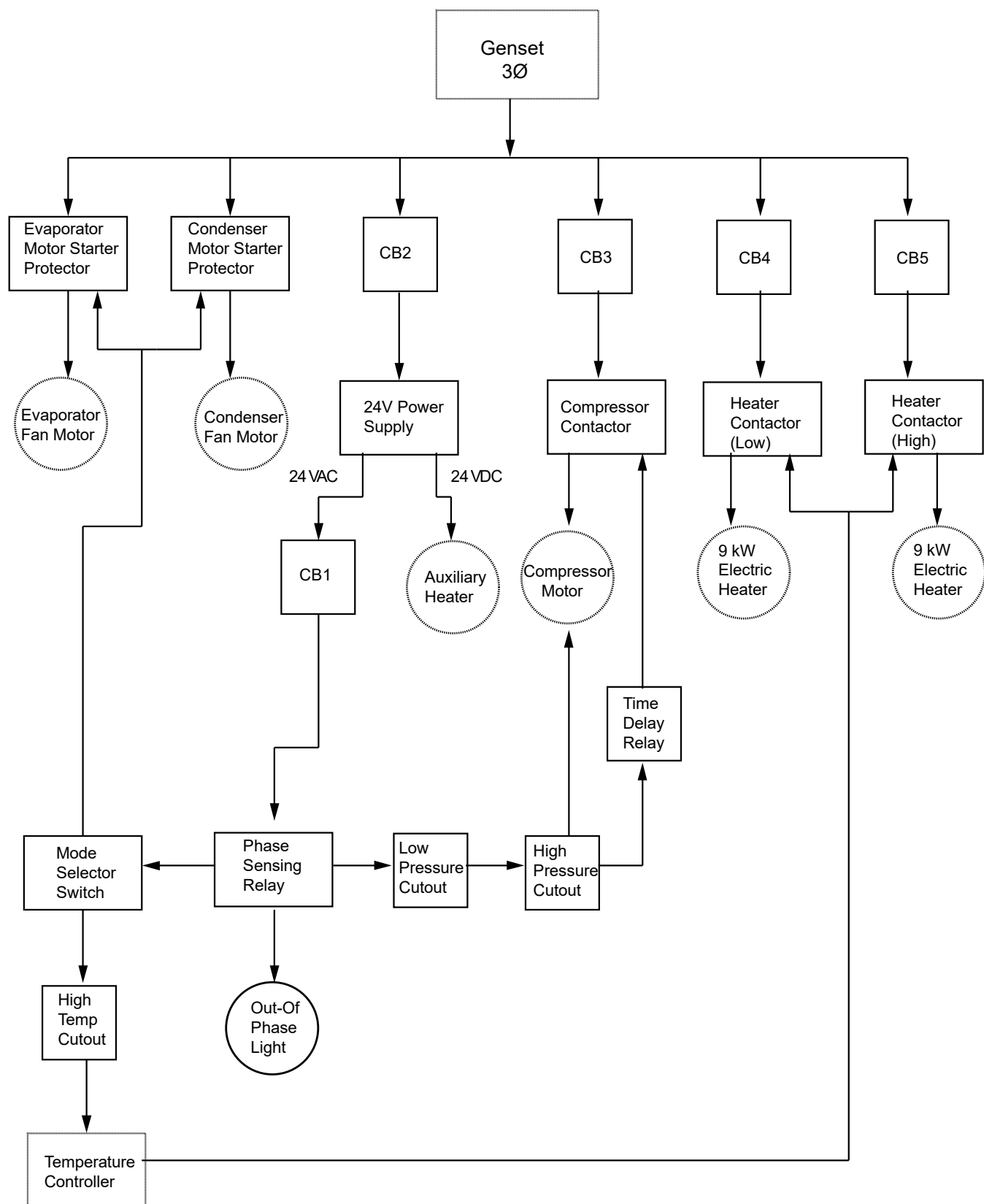


Figure 11. Power Distribution/Fault System (Version 2).

Heating System

The Heating System consists of the following:

- Temperature Control
- CB3 power to compressor motor
- CB4 power to 9 kW heater coil, low (V2)
- CB5 power to 9 kW heater coil, high (V2)
- Heater contactor, low
- Heater contactor, high
- Evaporator blower fan
- Baffle

The temperature control is set by the operator and senses the air temperature in the return duct. It applies a 24 VAC control line to the appropriate contactor for heating or cooling to maintain the operator setting.

CB3 supplies power to the compressor motor. CB4 and CB5 supply power to the 9 kW low heat and 9kW high heat coils respectively. Heater Contactor (CHT) Low switches line power to the low heat coil and CHT High switches power to the high heat coil. When the Mode Select Switch (MSS) is set to High Heat both coils are switched on to supply 18 kW heat.

The evaporator blower fan is a one speed blower. It forces warmed air through the duct work during the heat mode and cooled air when in cool mode. The baffle is located on the intake duct. Since the blower is a one speed fan the baffle is used to regulate air flow across the heater coils. Closing the baffle will cause greater heat transfer from the coils and increases heat output.

Auxiliary Heater System

The Auxiliary Heating System consists of the following:

- Hydronic heater
- Hydronic heater radiator
- Auxiliary heater switch
- Mode select switch
- Built-in self-test

The auxiliary heater is a hydronic heater located in the condenser enclosure. It provides additional heat for extreme cold weather. The heater burns diesel fuel supplied by the generator fuel tank to warm a hot water radiator. It operates in either manual or automatic mode according to the AUXILIARY HEATER select switch.

The Mode Select Switch (MSS) determines how the heater operates in conjunction with the main heating and cooling systems. With the MSS switch set to HEAT LOW/HIGH the auxiliary heater can be used to provide additional heat to a shelter. With the MSS switch set to OFF the heater can be used to thaw out the evaporator motor in extreme cold weather operation. The auxiliary heater is disabled when the MSS switch is set to COOL.

The auxiliary heater has built-in circuits to continually monitor operation. In the event of an operational failure a flash code is generated and displayed on the AUXILIARY HEAT switch.

Cooling System (Refrigeration)

The components of cooling system and their interaction are described below. The refrigeration components of the cooling system consist of the following:

- Compressor
- Vibration isolators
- Condenser fan
- Condenser coils
- Quench valve
- Filter/Dryer
- High pressure relief valve
- Service port (Hi & Lo)
- Sight glass
- Hot gas-bypass valve
- Solenoid valve
- Thermal expansion valve and distributor
- Evaporator fan
- Evaporator coils

The Compressor (CMP) compresses refrigerant in the closed system. The pressure differential across the low pressure suction side and high pressure discharge side causes circulation. The Vibration Isolators (VI) decrease stress on the copper refrigerant lines created by transmission of compressor induced vibration. The input and output lines are also protected by high pressure and low pressure cutoff switches which shut down the compressor in the event of a pressure fault.

The Condenser Fan (CF) draws cool ambient air into the condenser enclosure. The air is then passed through and warmed by the Condenser Coils (CC). The fan then forces the warm air to exit through the coils. The condensation process converts the high pressure gas into a high pressure liquid.

The liquid refrigerant from the condenser passes through a Filter/Dryer (F/D) which removes any water vapor or debris. The F/D stops contaminants from clogging the Thermal Expansion Valve and Distributor (TEV/D). The TEV/D allows fluid to enter the evaporator at a controlled pressure. It meters the flow of high pressure liquid refrigerant, so the evaporator coils can maintain the correct amount of refrigerant required for the superheat process. The TEV/D valve is regulated by a sensing bulb that is attached to the output of the evaporator (suction side). The sensing bulb must maintain good thermal contact with the suction line for accurate operation. The bulb is also insulated to provide more accurate feedback.

A High Pressure Relief Valve (HPRV) is located downstream of the F/D before the high pressure service port. The HPRV acts as a safety to vent fluid from the system, releasing pressure before the bursting point of the copper tubing is reached. Since the copper utilized in the refrigeration system has a 600 lb bursting pressure rating the HPRV valve is set to open at 550 psig.

The Sight Glass (SG) provides a window into the liquid flow where service personnel can observe fluid condition. Bubbles occurring in the SG are one indication of an ECU failure.

The Solenoid Valve (SV) is opened and closed by the temperature controller allowing fluid to enter the evaporator. It is part of a feedback loop between the temperature controller and the temperature sensor located in the duct leading to a shelter.

The evaporator fan, more appropriately called supply fan, operates in both cool and warm modes. For cool mode, warm shelter air is cooled by the evaporator coils and blown back into the shelter by the fan. For warm mode, cool shelter is warmed by the heater elements and forced back into the shelter. The evaporator coils are constructed of copper tubing with series of soft aluminum fins attached to increase heat transfer. As refrigerant passes through the coils, it absorbs heat from the surrounding air thereby cooling it. Another result of the transfer process is lower refrigerant pressure with a return to the gaseous state. A low pressure service port is located on the suction side of the evaporator coils between the evaporator and compressor.

Cooling System (Refrigeration) – Continued

The Hot Gas Bypass Valve (HGBV) is a pressure actuated mechanical valve. It keeps the pressure from dropping to low, on the suction side, and requiring long compression cycles to bring the pressure back up, on the discharge side. The valve is regulated by an equalization line that is attached to the low pressure line. A drop in pressure within the low pressure line, below 55 psig, causes the valve to open. The valve then allows hot compressed gas, from the discharge line of the compressor, to bypass the condensing and evaporator coils and return to the low pressure line directly.

The Quench Valve (QV) is controlled by both a temperature sensing bulb and pressure equalization line. When the valve is opened, cool refrigerant from condenser is allowed to mix with the hot bypass gas. The sensing bulb opens the valve when the superheat value of 20°F is reached. The equalization line then regulates how far to open the valve to maintain the superheat value.

TRAILER

Hydraulic Brake System

The hydraulic brakes are controlled by a surge actuator system. The rolling momentum of the trailer forces the surge actuator to compress during braking. The actuator applies pressure to the hydraulic cylinder synchronizing the towing vehicle and trailer brakes. The actuator also applies the brakes if the trailer breaks away from the towing vehicle.

The Hydraulic Brake System consists of the following:

- Hydraulic brake actuator assembly
- Hydraulic brake tube assemblies
- Brake hose assembly
- Wheel brake components

The major components of the hydraulic brake system and their functions are as follows:

Lunette Ring - attaches to the towing vehicle pintle hook. The lunette ring controls the master cylinder assembly. When the towing vehicle goes forward, the lunette ring is pulled and the brakes are released. When the towing vehicle slows down, the weight of the trailer pushes the lunette ring into the towing vehicle and the brakes are applied.

Master Cylinder Assembly – changes mechanical motion of the lunette ring and breakaway lever into hydraulic pressure. It has a built in shock absorber to prevent jerky lunette ring movement. The damper also slows the rate of the hydraulic pressure increase when the towing vehicle backs up, thus allowing the trailer to be slowly backed up for short distances on level terrain.

Breakaway Chain – attaches to towing vehicle. It will pull the breakaway lever up if the trailer and the towing vehicle uncouple.

Breakaway Lever – controls the master cylinder. When the lever is up, the brakes are applied. When it is down, the lunette controls the master cylinder.

Leaf Spring – holds the breakaway lever up. The breakaway lever must be reset any time it has been pulled up.

Hydraulic Brake Tubes and Hoses – transfer hydraulic pressure from the master cylinder assembly to the wheel cylinder.

Wheel Cylinder – changes hydraulic pressure into mechanical motion. When the wheel cylinder is pressurized, it pushes the brake shoes against the brake drum.

END OF WORK PACKAGE

CHAPTER 2
OPERATOR INSTRUCTIONS
FOR
HP-2C/185 UST Trailer

OPERATOR INSTRUCTIONS

HP-2C/185 UST Trailer

DESCRIPTION AND USE OF OPERATOR CONTROLS, INDICATORS, AND CONNECTORS

GENERAL

This work package contains illustrations and tables that describe the location and function of each control, indicator, and connector used for operation of HP-2C/185 UST Trailer. Each major panel is shown in detail in (Figures 1 through 712

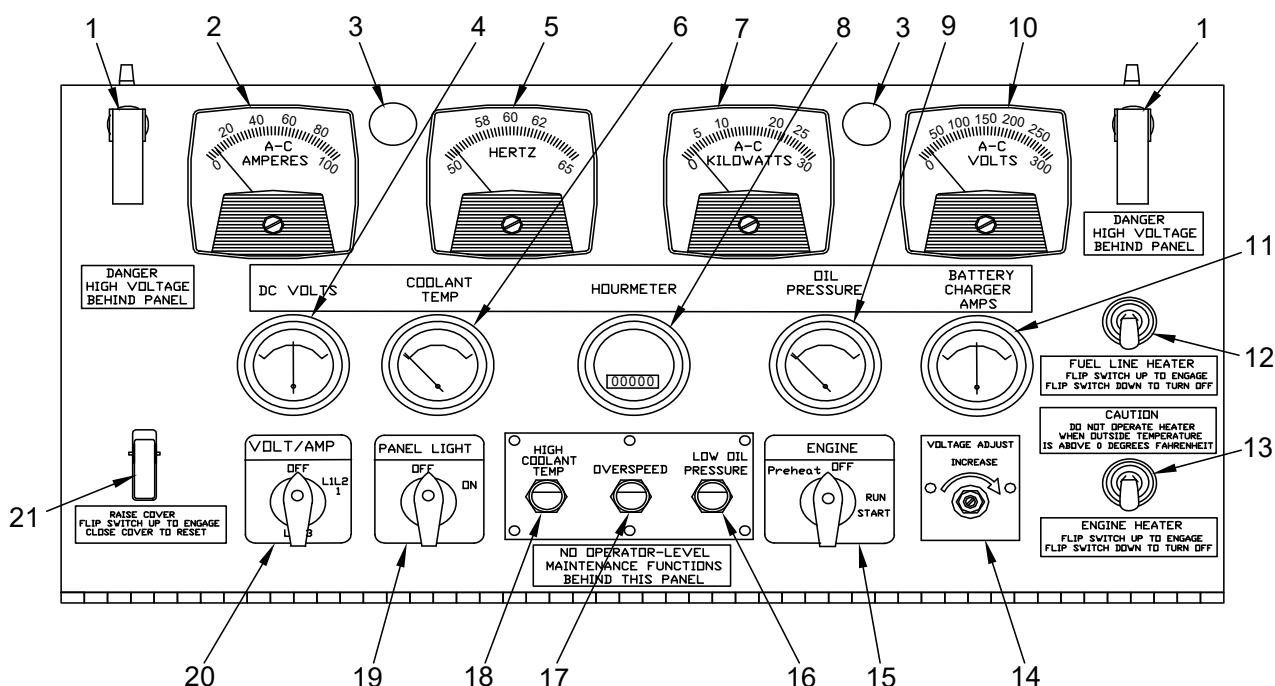


Figure 1. Genset Control Panel (Top Panel) – Controls, Indicators, and Connectors.

Table 1. Genset Control Panel (Top Panel) – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Panel Latch	Enables access to electrical enclosure behind Control Panel FOR AUTHORIZED TECHNICIANS ONLY.
2	A-C AMPERES meter	Indicates current drawn (Amps) from Genset.
3	Panel lights	Two panel lights illuminate Genset Control Panel.
4	DC VOLTS meter	Indicates 16-36 VDC voltage from battery system.
5	HERTZ meter	Indicates operating frequency (Hz) generated by Genset.
6	COOLANT TEMP meter	Indicates engine coolant temperature.

Table 1. Genset Control Panel (Top Panel) – Controls, Indicators, and Connectors – Continued.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
7	A-C KILOWATTS meter	Indicates power draw on Genset.
8	HOURMETER	Total Hours Accumulated - Indicates total operating hours of engine.
9	OIL PRESSURE meter	Indicates engine oil pressure in pounds per square inch (psi).
10	A-C VOLTS meter	Indicates operating voltage (V) generated by Genset.
11	BATTERY CHARGER AMPS meter	Indicates rate of charging current to battery system from Genset.
12	FUEL LINE HEATER switch	Pre-heats engine fuel for operation in cold weather climates where ambient temperatures are below 0°F (-17.77°C).
13	ENGINE HEATER switch	Starts auxiliary engine block heater within Genset for cold weather starting down to -50°F (-45.55°C). ENGINE HEATER flashes - An engine heater (hydronic) fault is present. For indicator functions see (Table 2 in WP 0012).
14	VOLTAGE ADJUST potentiometer	Enables manual adjustment of Genset output voltage.
15	ENGINE selector switch	Four-position switch controls engine operation. PREHEAT - allows cold engine glow plugs to warm up before attempting to start engine. OFF - Shuts down engine. RUN – Allows engine to run once glow plugs have warmed up. START – Energizes engine once glow plugs have warmed up.
16	LOW OIL PRESSURE light	Illuminates red if engine shuts down on low oil pressure.
17	OVERSPEED light	Illuminates red if engine shuts down from an over-speed condition.
18	HIGH COOLANT TEMP light	Illuminates red if engine shuts down from high coolant temperature.
19	PANEL LIGHT switch	Turns on panel lights. Turns off lights when released.
20	VOLT/AMP select switch	Four-position switch selects any two legs of Genset output for AC Ammeter and Voltmeter readings. OFF – Disconnect A-C AMPERES & A-C VOLTS meters from circuit. L1/L2 – Allows the A-C AMPERES and A-C VOLTS meters to indicate current and voltage present between legs L1 and L2. L2/L3 – Allows the A-C AMPERES and A-C VOLTS meters to indicate current and voltage present between legs L2 and L3. L3/L1 – Allows the A-C AMPERES and A-C VOLTS meters to indicate current and voltage present between legs L1 and L3.
21	BATTLE SHORT switch	Overrides shutdown protection devices to keep Genset operating.

GENSET CONTROL PANEL (BOTTOM PANEL)**NOTE**

The door covering the circuit breakers has been removed for clarity.

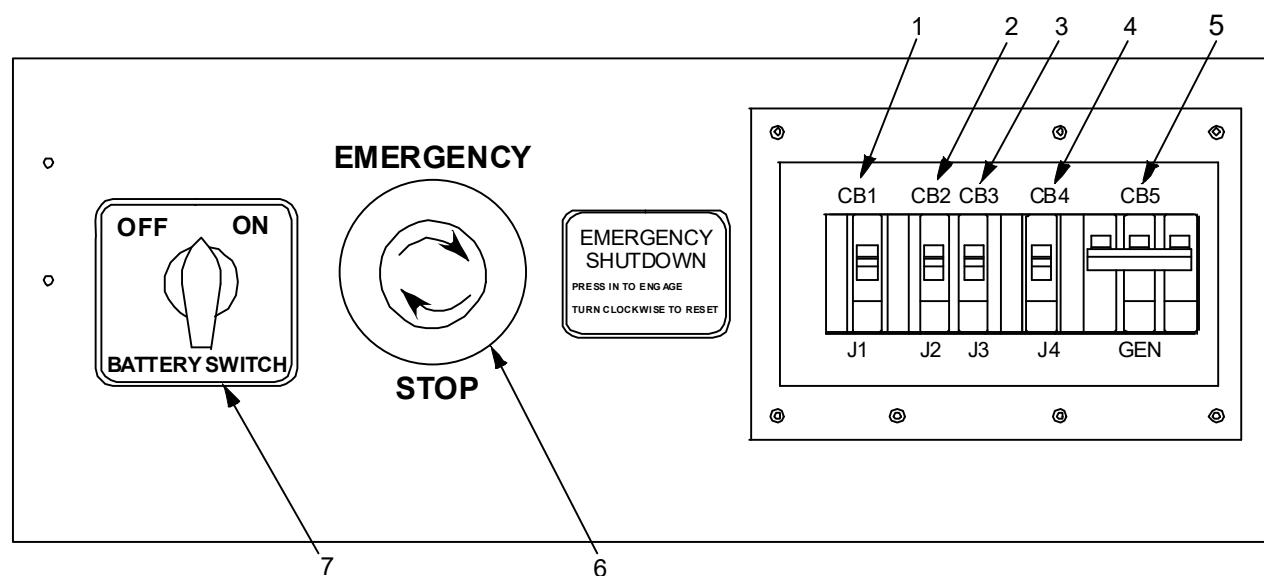


Figure 2. Genset Control Panel (Bottom Panel) – Controls, Indicators, and Connectors.

Table 2. Genset Control Panel (Bottom Panel) – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	CB1 J1 circuit breaker	3-Pole 60A protects ECU from over-power conditions.
2	CB2 J2 circuit breaker	1-Pole 20A protects 120 VAC outlet J2 at Power Distribution Panel.
3	CB3 J3 circuit breaker	1-Pole 20A protects 120 VAC outlet J3 at Power Distribution Panel.
4	CB4 J4 circuit breaker	3-Pole 30A protects additional load from over-power conditions.
5	CB5 GEN circuit breaker	3-Pole 90A protects loads connected to Genset from over-power.
6	EMERGENCY STOP button.	Push button immediately shuts down Genset.
7	BATTERY SWITCH	OFF – ON switch disconnects battery power to control panel.

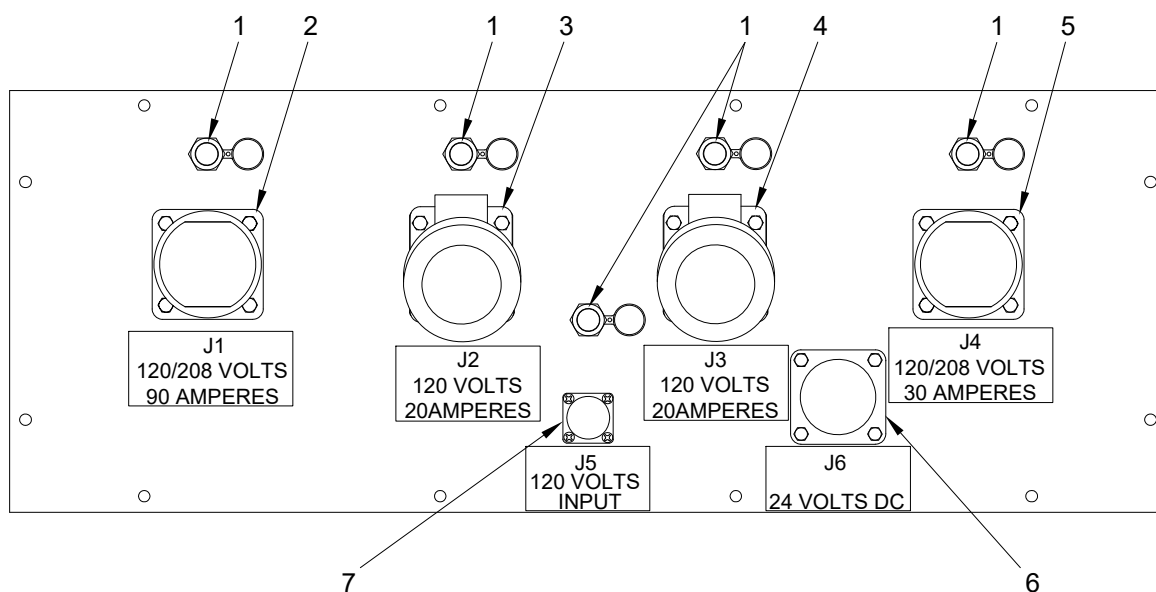
GENSET POWER DISTRIBUTION PANEL

Figure 3. Power Distribution Panel - Controls, Indicators, and Connectors.

Table 3. Power Distribution Panel - Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Amber indicator lamps with blackout covers	(Blackout) Swivel-to-test indicates power is present at respective receptacle.
2	J1 120/208 VOLTS 90 AMPERES receptacle	Connects generator to ECU.
3	J2 120 VOLTS, 20 AMPERES receptacle	Provides AC power for shelter lighting and utility outlets.
4	J3 120 VOLTS, 20 AMPERES receptacle	Provides AC power for shelter lighting and utility outlets.
5	J4 120/208 VOLTS, 30 AMPERES receptacle	Provides AC power for general use.
6	J6 24 VOLTS DC receptacle	NATO/Slave receptacle accepts 24 VDC power for emergency starting from an external source or provides 24 VDC power to an external requirement.
7	J5 120 VOLTS INPUT receptacle	Allows battery charging from a 120 VAC external source. The five foot battery charger cable connects to this receptacle.

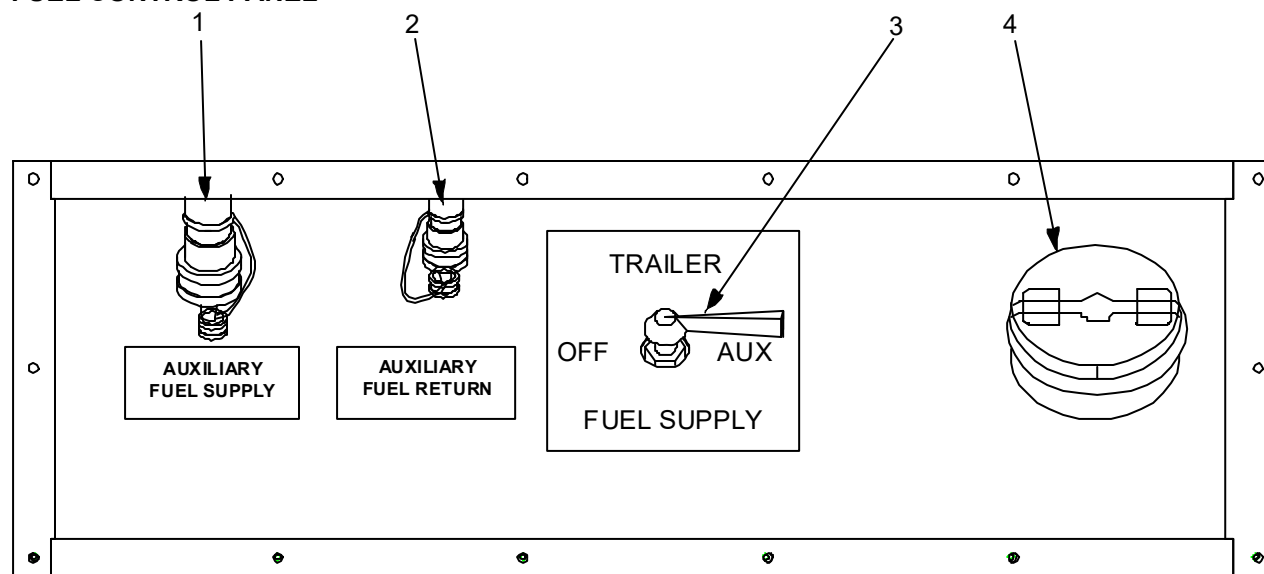
FUEL CONTROL PANEL

Figure 4. Fuel Control Panel – Controls, Indicators, and Connectors.

Table 4. Fuel Control Panel – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	AUXILIARY FUEL SUPPLY connector	Quick connect/disconnect fitting and bulb primer to deliver fuel from external source.
2	AUXILIARY FUEL RETURN connector	Quick connect/disconnect fitting to maintain static air pressure within fuel system and external fuel source.
3	FUEL SUPPLY switch	Three position switch which closes fuel supply or selects fuel supply source. OFF position if fuel system is being serviced or if engine is not going to be run for an extended period of time. TRAILER position if engine is to run from trailer fuel tank. AUX position if engine is to run from an auxiliary fuel supply.
4	Filler cap	Covers pipe for putting fuel into fuel tank.

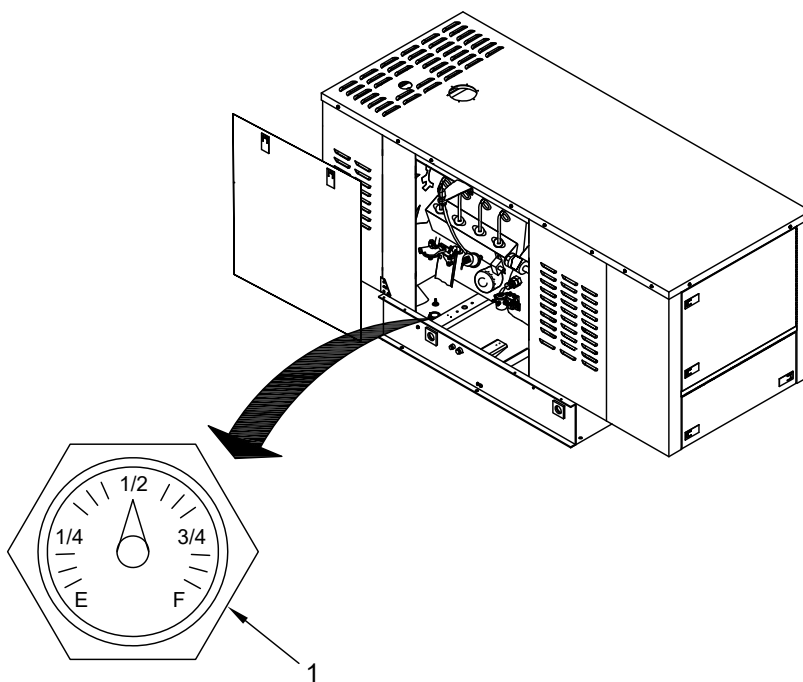
FUEL GAUGE

Figure 5. Fuel Gauge – Controls, Indicators, and Connectors.

Table 5. Fuel Gauge – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Fuel Gauge	Gives indication of fuel present in Genset fuel tank.

ECU CONTROL PANEL

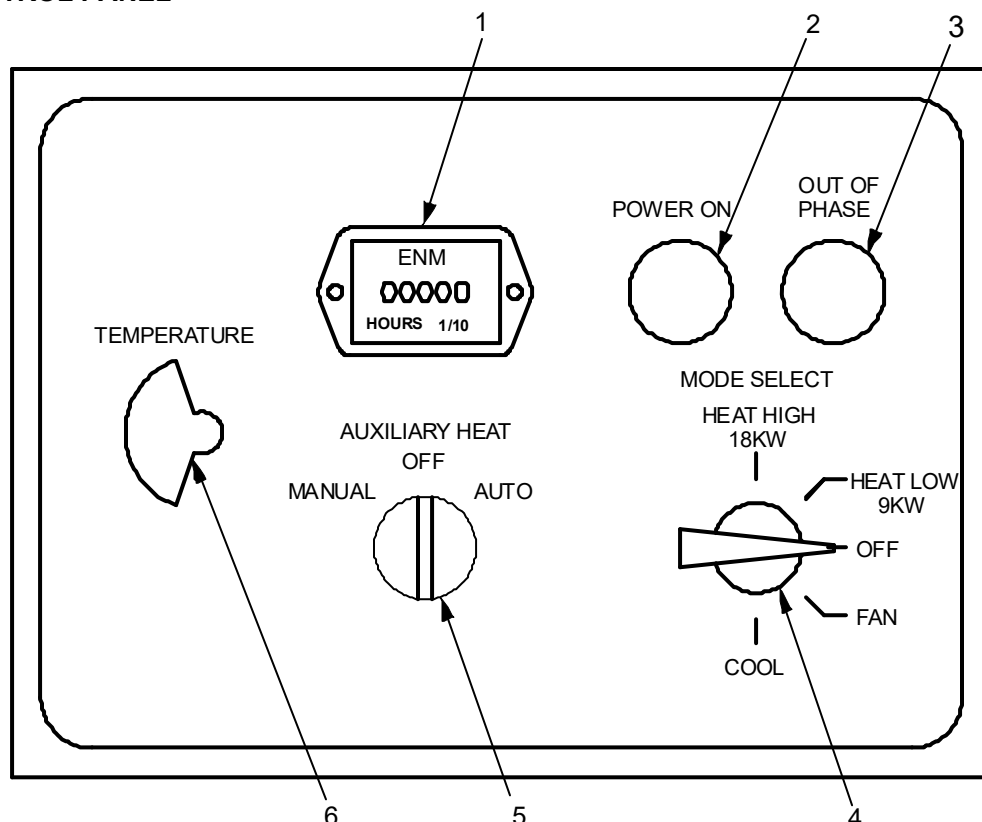


Figure 6. ECU Control Panel – Controls, Indicators, and Connectors.

Table 6. ECU Control Panel – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	Hour-meter	Indicates total number of run-time hours on ECU.
2	POWER ON indicator light	Illuminates green when power is present in the unit.
3	OUT OF PHASE indicator light	Illuminates red when power source (i.e. Genset, shore power) is incorrectly phased.
4	MODE SELECT switch	Five-position switch selects mode of operation. HEAT HIGH/18KW - Provides heated air to be circulated through the ducts. Draws near maximum electrical power from the Genset. HEAT LOW/9KW - Provides heated air to be circulated through the ducts. Draws approximately one-half maximum electrical power from the Genset. OFF - De-energizes the ECU. FAN - Provides fresh air only through the ducts. COOL - Provides conditioned air to be circulated through the ducts. The ECU draws approximately one-half maximum electrical power from the Genset.

Table 6. ECU Control Panel – Controls, Indicators, and Connectors – Continued.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
4 (cont.)	MODE SELECT switch	<p>Certain models have a four-position switch (HEAT-OFF-FAN-COOL) that selects mode of operation. Their functions are:</p> <p>Four-position switch selects mode of operation. HEAT – Selects heat mode of ECU utilizing 18 KW of power from the Genset. OFF – De-energizes the ECU. FAN – Provides fresh air only through the ducts. COOL – Provides conditioned air to be circulated through the ducts. The ECU draws 18 KW of power in this mode.</p>
5	AUXILIARY HEAT indicator/switch light	<p>Three position switch which selects mode of operation.</p> <p>MANUAL – Continuous heat to shelter. OFF – No heat to shelter. AUTO – Thermostatically controlled heat to shelter.</p> <p>AUXILIARY HEAT flashes - A hydronic heater fault is present. See indicator functions (Table 2 in WP 0011 or WP 0030).</p>
6	TEMPERATURE dial	Allows operator to manually regulate shelter interior temperature.

POWER DISTRIBUTION UNIT (PDU)

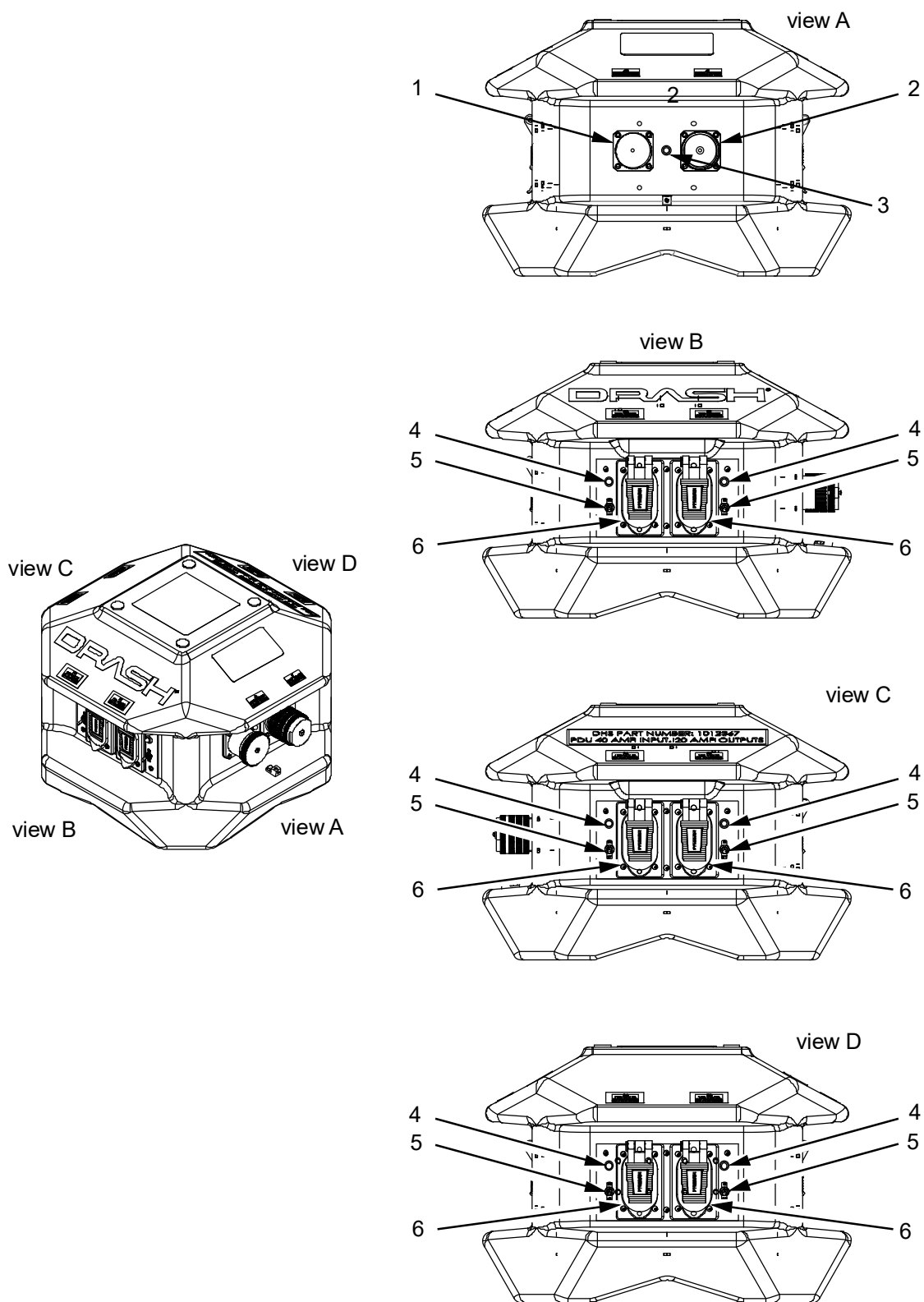


Figure 7. Power Distribution Unit (PDU) – Controls, Indicators, and Connectors.

Table 7. Power Distribution Unit (PDU) – Controls, Indicators, and Connectors.

ITEM	CONTROLS, INDICATORS, AND CONNECTORS	FUNCTION
1	J1 INPUT POWER 120/208 VAC 3 PHASE connector	One 5-Pin Class L 208VAC 60A Female connector.
2	J2 OUTPUT POWER 120/208 VAC 3 PHASE	One 5-Pin Class L 208VAC 60A Male connector.
3	Red Indicator LED	Indicates PDU connected to 120/208 VAC 3 phase live power source.
4	Red Indicator LED	Six red LEDs indicate 125 VAC single phase power is available at associated receptacle.
5	Circuit Breaker	Six 120V, 20A GFCI circuit breakers for associated receptacle.
6	120V 20A GFCI Receptacle	Six 120V, 20A GFCI duplex output receptacles..

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS
HP-2C/185
OPERATION UNDER USUAL CONDITIONS

INITIAL SETUP:**Tools and Special Tools**

Field repair kit

ReferencesWP 0004, WP 0006, WP 0009,
WP 0011, WP 0019, WP 00028**Personnel Required**

Four to six

GENERAL

The following WP covers site selection, setup, and initial power-up procedures of the HP-2C/185 trailer system. The manual also covers power-down, teardown, and storing of the system.

SECURITY MEASURES FOR ELECTRONIC DATA

Follow the security measures described in AR 25-2, Information Assurance, to control access to classified electronic data. For the HP-2C/185 system, follow the procedures described in the current version of the User Security Manual/Standard Operating Procedure (USM/SOP).

SITE REQUIREMENTS

To ensure minimal problems and good operation of the HP-2C/185 system, ensure area is:

- Dry
- Level with minimum clearing of 16 feet (4.9 meter) x 7.1 feet (2.2 meter) for deployment and operation of trailer, and any associated equipment (Figure 1).
- Free of hazards (e.g., trees, buildings, or other structures), that would cause physical interference with the system and any associated equipment.
- Free of any obstructions that would interfere with the air intakes and exhausts of the ECU and Genset.

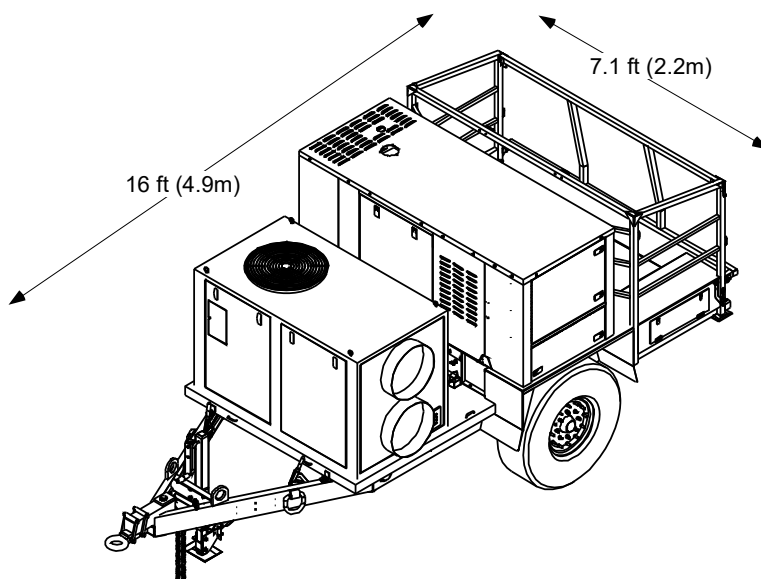


Figure 1. HP-2C/185 System Deployment Footprint.

ASSEMBLY AND PREPARATION FOR USE

Perform all set-up and PMCS procedures (WP 0017) before operating the trailer.

Review all tow vehicle operating instructions before coupling or uncoupling the trailer.

Review On-Vehicle Equipment Loading Plan, (WP 0009) and become familiar with equipment location.

TRAILER SETUP

Securing Trailer for Operation

WARNING

The HP-2C/185 trailer must be level to prevent equipment damage.
Genset exhaust fumes must be directed away from the shelter, the trailer, and personnel.

1. After positioning trailer in an operational position, engage two handbrakes (Figure 2, Item 1).
2. Lower two rear stabilizer legs (Figure 2, Item 3). Place rear stabilizer pads as close to ground as possible.

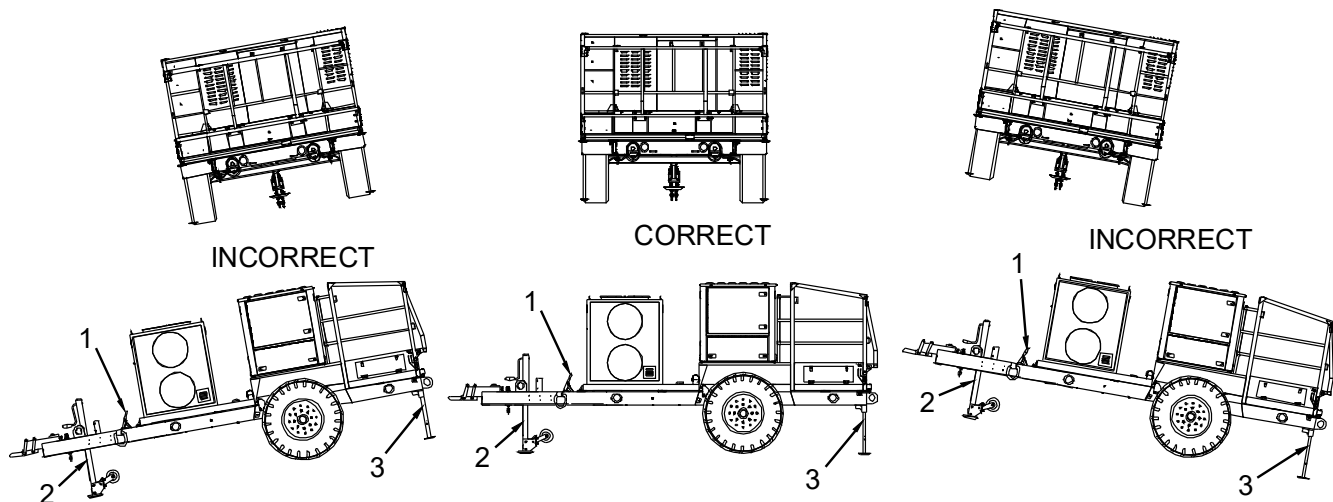


Figure 2. Correct Trailer Operating Positions.

NOTE

A combined wheel/skid plate assembly is provided with the trailer to maintain the trailer in a level operating position when the tow vehicle disconnects from the trailer. The wheel/skid plate assembly must be secured to the tongue jack before disconnecting the tow vehicle.

Use the skid plate to stabilize the trailer in most operating environments. Use the wheel when necessary to move short distances when the trailer needs to be repositioned without a tow vehicle.

If terrain around the trailer is soft, uneven, or generally unfavorable, do not use the wheel.

3. Remove two assembly pins (Figure 3, Item 3) holding wheel/skid plate assembly (Figure 3, Item 1) to storage post (Figure 3, Item 8).

4. Raise tongue jack post (Figure 3, Item 4) by rotating tongue jack hand crank (Figure 3, Item 2).
5. Position wheel/skid plate assembly so that either skid plate (INSET A) or wheel (INSET B) is facing the ground below the tongue jack post (Figure 3, Item 4). If wheel/skid plate assembly does not clear the ground, continue turning the tongue jack hand crank to raise the tongue jack post (Figure 3, Item 4).
6. Lift wheel/skid plate assembly up into tongue jack extension until wheel/skid plate clears ground and insert upper assembly pin (Figure 3, Item 3) in extension pin hole.
7. Insert lower assembly pin (Figure 3, Item 3) to secure wheel/skid plate assembly to tongue jack extension.
8. Rotate tongue jack hand crank to lower tongue jack post until trailer is supported by wheel or skid plate.
9. Extend two rear stabilizer legs (Figure 3, Item 6).
10. Check that bubble level on trailer indicates that trailer is level.

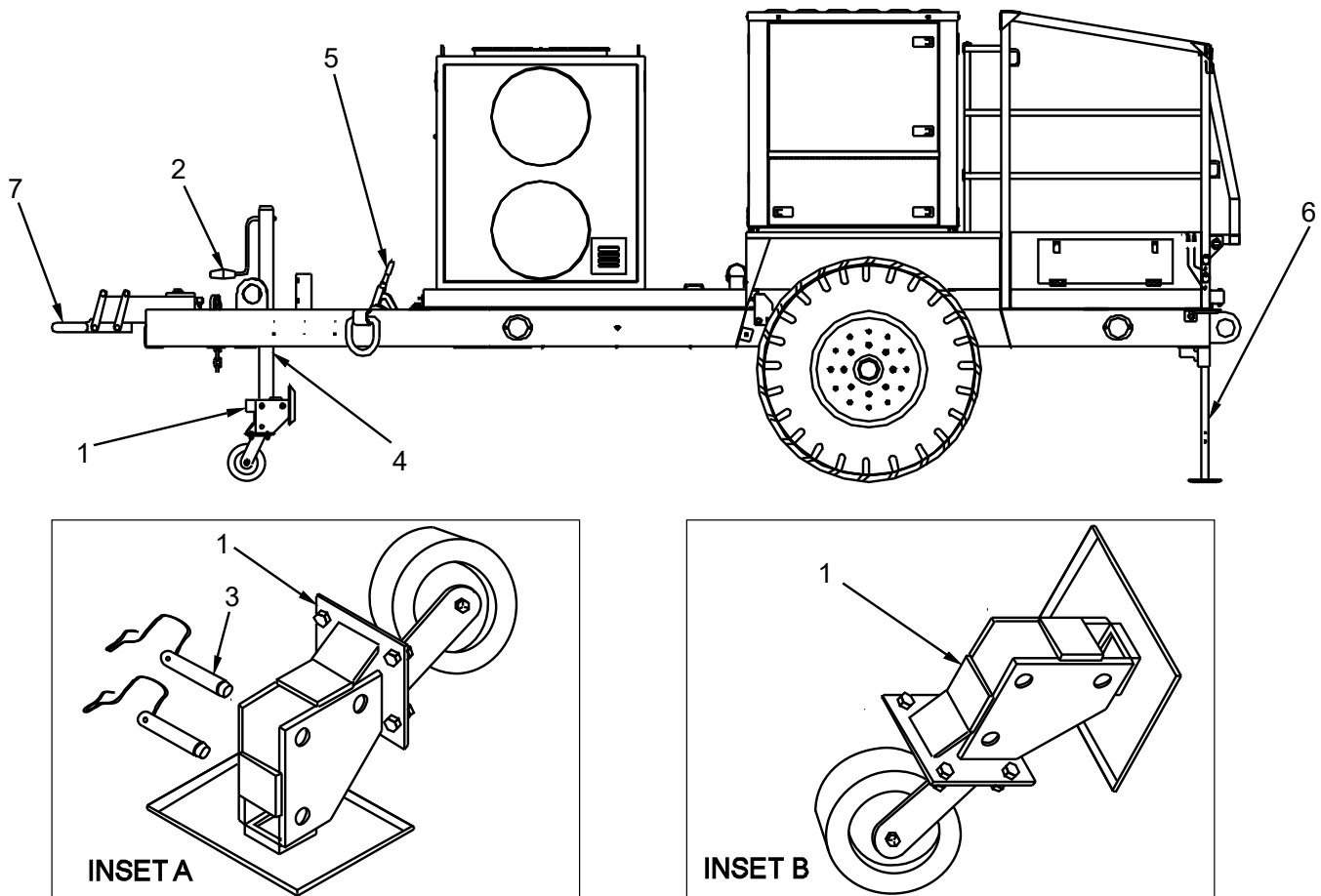
END OF TASK

Figure 3. Wheel/Skid Plate Assembly Mounting Positions.

Chock Wheels**NOTE**

Wheel chocks are not provided with equipment.

1. If trailer is parked on level ground and neither side of trailer needs to be raised, place one chock block (Figure 4, Item 1) in front of one tire and place another chock block (Figure 4, Item 2) in back of the other tire.
2. If trailer is parked on level ground and one side of trailer needs to be raised, place chock blocks (Figure 4, Item 3) in front and back of tire remaining on the ground.
3. If trailer is parked on an incline with tongue of trailer facing uphill, place chock blocks (Figure 4, Item 4) in back of both tires.
4. If trailer is parked on an incline with tongue of trailer facing downhill, place chock blocks (Figure 4, Item 5) in front of both tires.

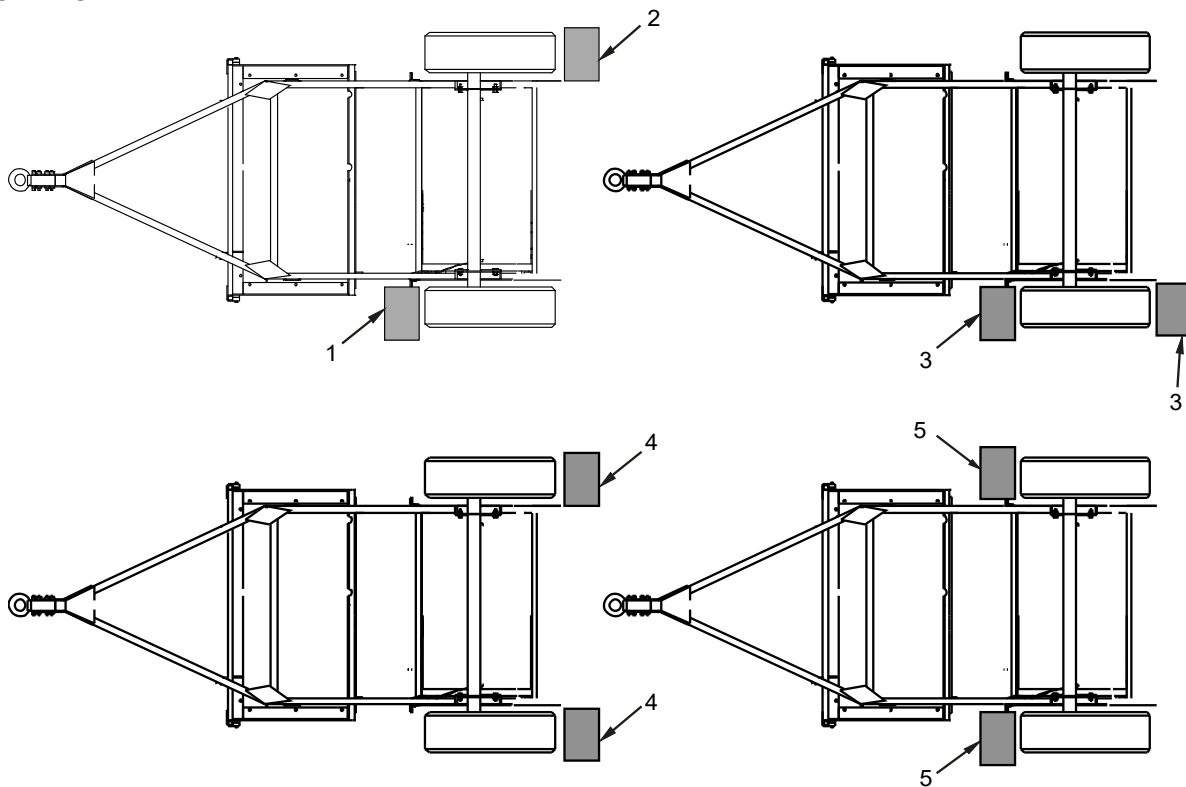
END OF TASK

Figure 4. Wheel Chocks.

Uncouple Trailer from Towing Vehicle**WARNING**

If trailer is loaded, rear stabilizer legs must be deployed prior to opening pintle hook. Failure to follow this warning may result in injury to personnel or damage to equipment.

1. Ensure two handbrakes (Figure 3, Item 5) are engaged.
2. Disconnect trailer inter-vehicular cable, safety breakaway cable, and safety chains from the towing vehicle.
3. Open towing vehicle pintle hitch by removing safety pin and lifting locking latch.

Uncouple Trailer from Towing Vehicle – Continued**WARNING**

The trailer tongue is heavy - up to 420 lb (190.5 kg) loaded tongue weight. Use front crank to raise and lower trailer tongue. If tongue jack is inoperative, remove load from trailer and use four or more persons to lift trailer tongue. Failure to follow this warning may result in serious personnel injury or equipment damage.

4. Rotate trailer tongue jack hand crank (Figure 3, Item 2) to raise trailer tongue so that lunette ring is clear of pintle hook.

CAUTION

When operating hand crank, do not force tongue jack extension beyond normal operating range or permanent damage may occur.

5. Close towing vehicle pintle hitch, reinsert safety pin, move tow vehicle away from trailer.

END OF TASK**Install Ground Rod Assembly**

The trailer is equipped with three-section grounding rod with drive stud and three bronze couplings. One 25 foot # 6 AWG ground wire is provided for grounding trailer to ground rod assembly.

WARNING

Improper or no equipment grounding can result in serious electrical shock or death. Refer to "Earth Grounding and Bonding Pamphlet", CECOM TR-98-6, Oct 1998 for more detailed information on grounding equipment.

Wear eye protection and gloves when hammering stakes and ground rod sections. Failure to observe this warning may result in injury to the eye or exposed skin from flying metal fragments.

1. Remove grounding rods from trailer bed (located on trailer bed between ECU and Genset).
2. Obtain sledge hammer.

NOTE

Refer to TM 11-5820-1118-12&P for appropriate grounding.

The best position for the grounding rod assembly is by the front roadside of the trailer where the bubble level is located.

In rocky areas where the grounding rod cannot be driven into the ground, dig a six inch trench and lay the grounding rod on its side.

In very dry conditions, keep the ground wet where the grounding rod is located.

3. Attach threaded collar to first section of grounding rod. Using sledge hammer, drive first section of grounding rod into earth until top of rod is just above surface of hole. Use threaded collar to attach and drive in the two remaining grounding rods.
4. Connect ground wire to grounding rod assembly with threaded collar and bolt.
5. Connect ground wire to trailer ground stud (GROUND CONNECTION), located on roadside under ECU. Secure using washer and wing nut.

END OF TASK

GENERATOR FUELING

Fueling Genset from Fuel Control Panel

Check the fuel level in the trailer fuel tank by viewing the mechanical fuel level indicator located behind a hinged access door (Figure 5, Item 1) between the ECU and the Generator.

WARNING

Diesel fuel is flammable. Do not fill fuel tank with engine running, while smoking, or when near an open flame. Never overfill tank or spill fuel. If fuel is spilled, clean it up immediately. Failure to comply may result in serious injury or death.

Add fuel as follows if needed:

1. Check fuel level by opening fuel sight door (Figure 5, Item 1).
2. Remove fuel cap (Figure 5, Item 2) located on Fuel Control Panel (Figure 5, Item 3). A plastic funnel is provided and found in storage compartment.
3. Fill fuel tank with fuel.
4. Re-install fuel cap on filler mouth.
5. Recheck fuel level.

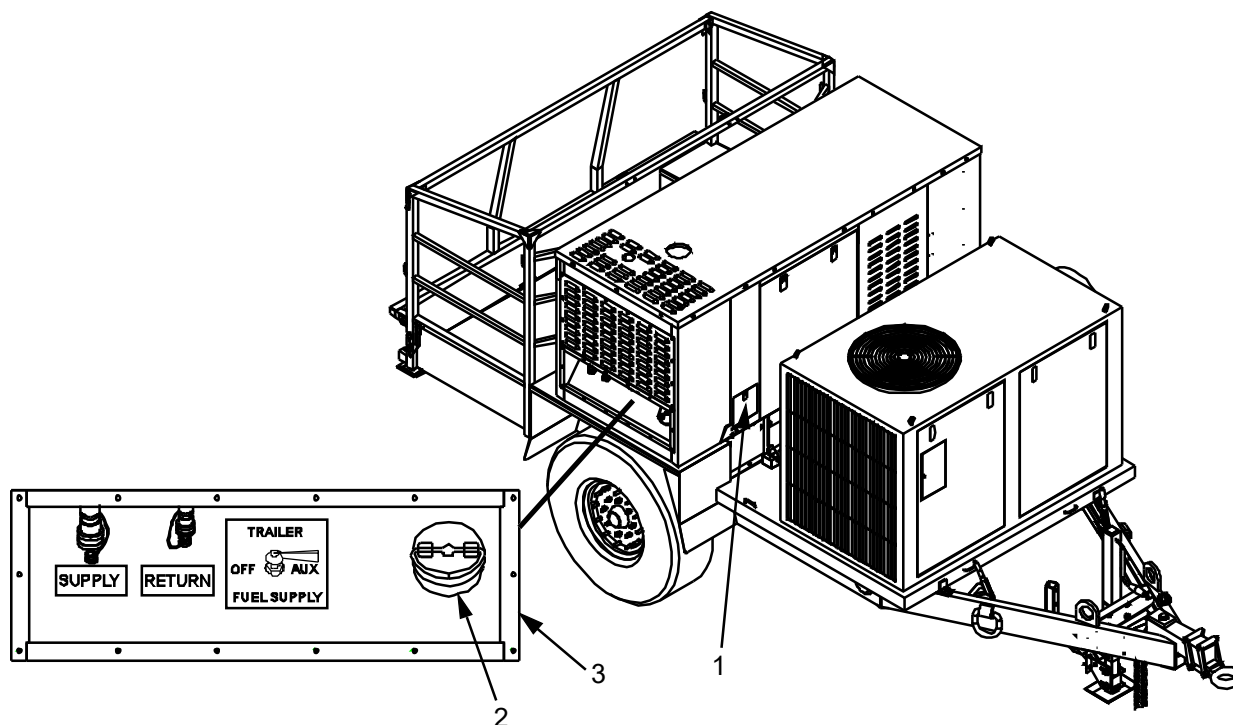


Figure 5. Location of Fuel Control Panel.

END OF TASK

Fueling Genset from Auxiliary Fuel Source

HP-2C/185 trailer comes with one auxiliary fuel return line (Figure 6, Item 1) and one auxiliary fuel supply line (Figure 6, Item 3). The auxiliary fuel supply line has a bulb primer (Figure 6, Item 4) to start fuel moving from the external source.

1. Insert end of auxiliary fuel supply line (Figure 6, Item 3) closest to bulb into auxiliary fuel source (Figure 6, Item 2). Connect opposite end to AUXILIARY FUEL SUPPLY connector (Figure 6, Item 6).
2. Insert end of auxiliary fuel return line (Figure 6, Item 1) into auxiliary fuel source (Figure 6, Item 2). Connect opposite end to AUXILIARY FUEL RETURN connector (Figure 6, Item 5).
3. Turn FUEL SUPPLY switch to AUX position.
4. Prime bulb (Figure 6, Item 4) on auxiliary fuel supply line (Figure 6, Item 3) until resistance is felt. Check for any leaks.

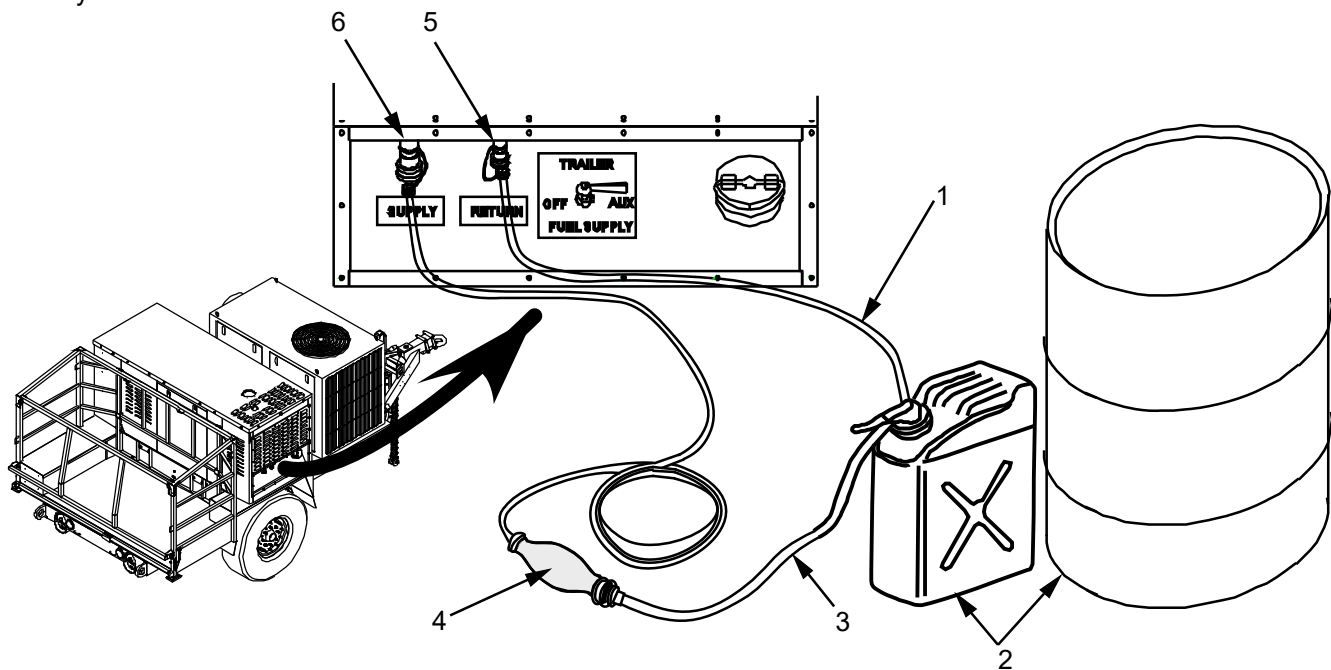


Figure 6. Aux Fuel Lines to External Fuel Supply.

END OF TASK

SYSTEM POWER-UP PROCEDURES**Genset Start Procedure**

1. Place BATTERY SWITCH on Circuit Breaker Panel to ON position.

NOTE

If engine is cold, (i.e., has not been operated within the last 2 to 3 hours), continue with Step 2.

If engine is warm, proceed to Step 3.

If operating in Arctic conditions, (i.e., ambient temperatures are 0°F or below), refer to Operation Under Unusual Conditions (WP 0006).

2. Place ENGINE selector switch on Genset Control Panel to PREHEAT position for approx 10 to 20 seconds.
3. Turn and hold ENGINE selector switch in the START position until engine starts. After engine starts, release ENGINE selector switch and it will spring-return to the RUN position.
4. Immediately after starting the engine,
 - Check lubrication oil pressure at OIL PRESSURE gauge on Genset Control Panel. The minimum oil pressure is 20 psi. (Normal oil pressure is 20 to 55 psi). If oil pressure does not rise promptly to over 20 psi, stop engine by turning ENGINE selector switch to OFF and contact service maintenance.
 - Check to see if leaks are evident, both inside and under enclosure. If leaks are present, turn engine off and call service maintenance.
5. Turn VOLT/AMP select switch from OFF to L1-L2 position. Read VOLTS meter. It should read 208 VAC. If not, fine-tune voltage to 208 VAC using VOLTAGE ADJUST potentiometer on Genset Control panel. With voltage set, verify that HERTZ frequency meter is reading between 60-61 Hz.
6. Turn VOLT/AMP select switch to L2-L3 position and check that AC VOLTS meter and HERTZ frequency meter readings are the same as for L1-L2. Do the same for L3/L1 position. If Genset does not deliver desired voltage and frequency or if there is a marked difference among the three legs, do not operate Genset. Contact service maintenance.
7. Move circuit breaker CB5 (GEN) on Circuit Breaker Panel to ON position. Power is now available from generator.

END OF TASK

Applying Power from Genset

1. To make power available at the J2 and J3 receptacles turn ON circuit breakers CB2 and CB3. When power is available at a receptacle, the indicator light above that receptacle will illuminate.

WARNING

Verify that circuit breaker CB1 is off before connecting ECU power cord to Power Distribution Panel. Serious injury or death could occur.

2. Connect power cable from ECU to receptacle J1 on Power Distribution Panel. Power is made available to ECU through receptacle J1 which in turn is protected by circuit breaker CB1.
3. Periodically check all meter readings on Genset Control Panel.

END OF TASK

ECU Start Procedure**NOTE**

Ensure airflow to and from the ECU is unobstructed. This includes the fan on top and louvers on the sides.

1. Ensure ECU power cable is connected to power source.
2. If using Genset power, turn CB1 on Circuit Breaker Panel to ON position. If using shore power, apply shore power.

ECU Start Procedure – Continued**CAUTION**

Do not run ECU with red OUT OF PHASE light on. Damage to motor can result.

3. Ensure green POWER ON indicator light on ECU Control Panel is lit.
4. Verify that red OUT OF PHASE indicator light on ECU Control Panel is not lit. If lit, conduct Out of Phase troubleshooting procedures in WP 0011 and WP 0028.

CAUTION

Do not set thermostat below 50 degrees in cool mode and not above 90 degrees in heat mode. Setting thermostat outside this range can cause the ECU to malfunction.

Do not adjust the thermostat frequently. Select a temperature and leave it. Frequent adjustment can cause premature failure of the thermostat.

5. Set TEMPERATURE dial to the desired temperature required to maintain a comfortable interior shelter temperature.

NOTE

Keep all shelter doors and windows, exterior and interior, closed as much as possible to maintain dead air space between the exterior and interior covers. Use camouflage netting or other shading means to reduce solar energy absorbed by the shelter.

6. Turn ECU MODE SELECT switch to appropriate position. Modes of operation are:
 - OFF, no ECU operation.
 - FAN, circulating fan only operation.
 - COOL, provides cool air and fan operation, utilizes 10kW of Genset power during cooling operations.
 - HEAT LOW 9 KW utilizes 9kW of Genset power during heating operations. The remaining power may be used to power ancillary devices.
 - HEAT HIGH 18 KW utilizes 18kW of Genset power during heating operations. The minimal remaining power may be used to power only a few ancillary devices.

END OF TASK

ECU Shut-Down Procedure

1. Turn ECU MODE SELECT switch on the ECU Control Panel to OFF position.
2. Turn CB1 on Genset Circuit Breaker Panel to OFF position. If using shore power, turn OFF.
3. Disconnect ECU power cable from power source (J1 on Power Distribution Panel or shore power).
4. Stow ECU power cable on trailer bed between ECU enclosure and Genset enclosure.

END OF TASK**Genset Shut-Down Procedure**

1. Verify that ECU and PDU have been shut down.
2. Set all circuit breakers on Circuit Breaker Panel to OFF position. There should be no load on generator.
3. On Genset Control Panel, turn VOLT/AMP select switch to OFF position.

CAUTION

Verify that all circuit breakers on Genset Circuit Breaker Panel are in the OFF position prior to stopping the engine.

4. On Genset Control Panel, turn ENGINE select switch OFF position.
5. On Genset Circuit Breaker Panel, turn BATTERY SWITCH to OFF position.

END OF TASK**Disconnect Grounding Rod Assembly**

1. Remove wing nut and washer from trailer ground stud (GROUND CONNECTION) (located on roadside under ECU) and disconnect ground wire. Replace washer and wing nut onto trailer ground stud (GROUND CONNECTION).
2. Disconnect ground wire from grounding rod assembly. Coil up ground wire and set aside.
3. Loosen and remove grounding rod from earth ground. If necessary, disassemble grounding rod one section at a time by loosening and removing bronze couplings.
4. Disconnect threaded collar from first section of grounding rod.
5. Return ground wire, threaded collar and bronze couplings to storage.
6. Secure grounding rod sections to trailer bed (between ECU and Genset enclosures).

END OF TASK

SYSTEM PACKING AND LOADING

Coupling the Trailer to a Tow Vehicle

WARNING

Power to the Genset batteries **MUST BE** turned off prior to moving the trailer. Failure to follow this warning may result in serious equipment damage and personnel injury.

1. Verify that all circuit breakers and switches are in the OFF position.
2. Verify that power to the batteries is off by ensuring the BATTERY SWITCH on the Circuit breaker Panel is in the OFF position.

WARNING

Ensure that towing vehicle and trailer are on level ground before coupling. Failure to follow this warning may result in serious personnel injury or equipment damage.

3. Apply both handbrakes (Figure 7, Item 1).

WARNING

Ensure weight of trailer is on tongue jack post (Figure 7, Item 2) before raising rear stabilizer legs. Failure to follow this warning may cause trailer to tip, resulting in serious injury to personnel or damage to equipment.

4. Fully retract and secure both rear stabilizer legs (Figure 7, Item 3).

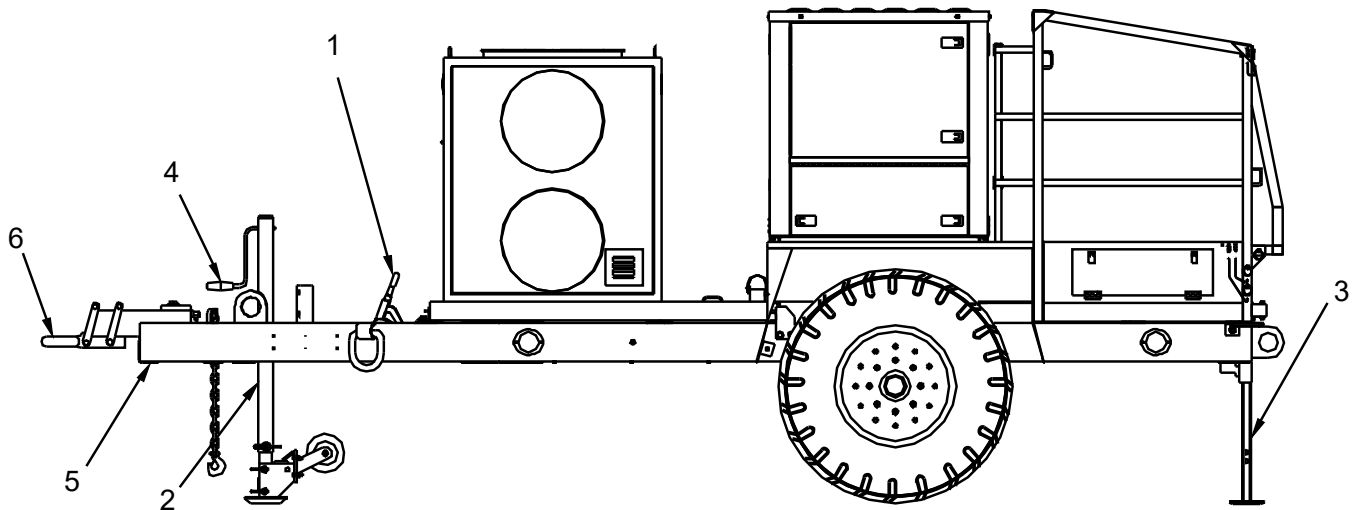


Figure 7. Trailer Levelled and Secured.

5. Rotate tongue jack hand crank (Figure 7, Item 4) to raise trailer tongue (Figure 7, Item 6) until lunette ring (Figure 7, Item 6) is higher than towing vehicle pintle hook.

Coupling the Trailer to a Tow Vehicle – Continued**WARNING**

When operating the tongue jack hand crank do not force the tongue jack beyond the normal operating range, or permanent damage may occur.

The trailer drawbar is heavy - up to 420 lb (190.5 kg) loaded tongue weight. If the tongue jack is inoperative, remove load from trailer or use four or more persons to lift the drawbar. Failure to follow this warning may result in serious personnel injury or equipment damage.

6. Remove safety pin (Figure 8, Item 2) from pintle hitch (Figure 8, Item 1). Open pintle hitch (Figure 8, Item 1) by pulling up on locking latch (Figure 8, Item 4).

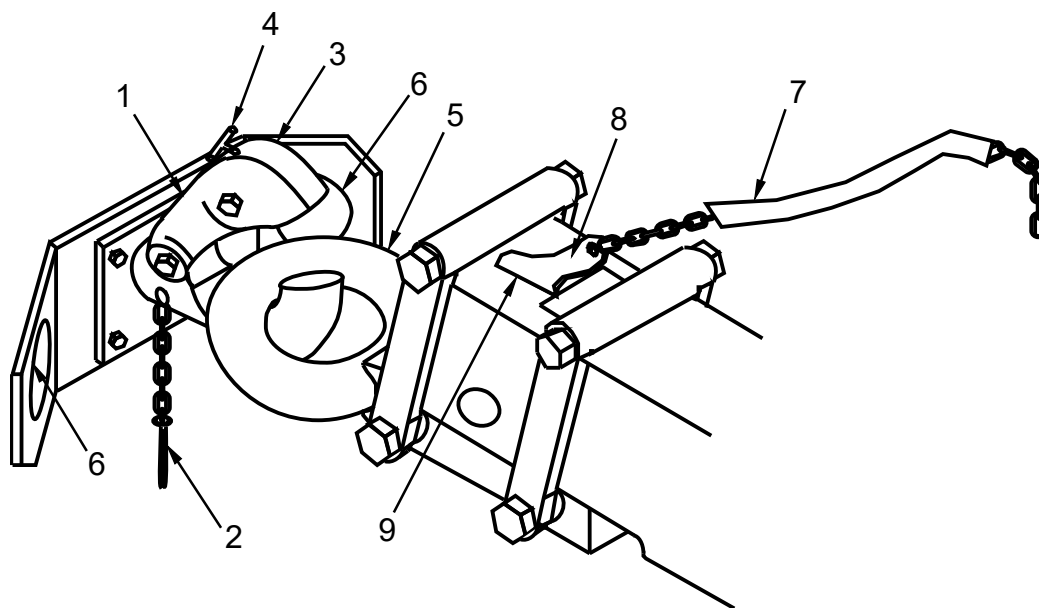


Figure 8. Attach Trailer to Tow Vehicle.

7. Back up towing vehicle in front of lunette ring (Figure 8, Item 5).
8. Adjust height of lunette ring (Figure 8, Item 5) by rotating tongue jack hand crank (Figure 7, Item 4).
9. Place lunette ring on towing vehicle pintle hook and close pintle hitch. Check that locking latch is locked by pulling up on pintle hitch. The pintle hitch should not come up.
10. Re-insert safety pin (Figure 8, Item 2) into pintle hitch (Figure 8, Item 1).
11. Cross two trailer safety chains under trailer tongue and hook to towing vehicle eyebolts (Figure 8, Item 6). If safety chains are too long, they can be twisted to be shortened. It is recommended that wire be used across hook openings to prevent accidental unhooking.

Coupling the Trailer to a Tow Vehicle – Continued**CAUTION**

Safety chains must be attached on opposite sides of the trailer tongue or frame and crossed under the tongue when passed forward to the towing vehicle so as to cradle the tongue in the event of a breakaway. Slack should only be sufficient to permit full turns.

Failure to provide enough slack can result in twisting the trailer tongue.

12. Attach safety breakaway cable (Figure 8, Item 7) to towing vehicle. Ensure there is enough slack in the cable to allow trailer to make full turns.

CAUTION

Ensure that breakaway lever is fully released. If the breakaway lever is not fully released, the brakes will drag, heat up, and burn out.

13. Ensure breakaway lever (Figure 8, Item 8) is pushed all the way back toward trailer and that breakaway lever is not engaged in leaf spring (Figure 8, Item 9).
14. Rotate tongue jack hand crank (Figure 9, Item 2) to raise wheel/skid plate assembly (Figure 9, Item 3) off the ground.
15. Remove two assembly pins (Figure 9, Item 4) holding wheel/skid plate assembly to tongue jack extension (Figure 9, Item 5).
16. Release extension pin (Figure 9, Item 6) and push tongue jack extension all the way up into tongue jack (Figure 9, Item 7). Secure tongue jack extension by reinserting pin in tongue jack.
17. Continue to rotate tongue jack crank to fully raise tongue jack.
18. Place wheel/skid plate assembly onto storage post (Figure 9, Item 11) with skid plate facing rear of the trailer.
19. Secure wheel/skid plate assembly to storage post by inserting two assembly pins.
20. Connect electrical plug on the inter-vehicular cable to receptacle of towing vehicle.
21. Check all towing vehicle and trailer lights for proper operation.
22. Release trailer handbrakes.

Coupling the Trailer to a Tow Vehicle – Continued

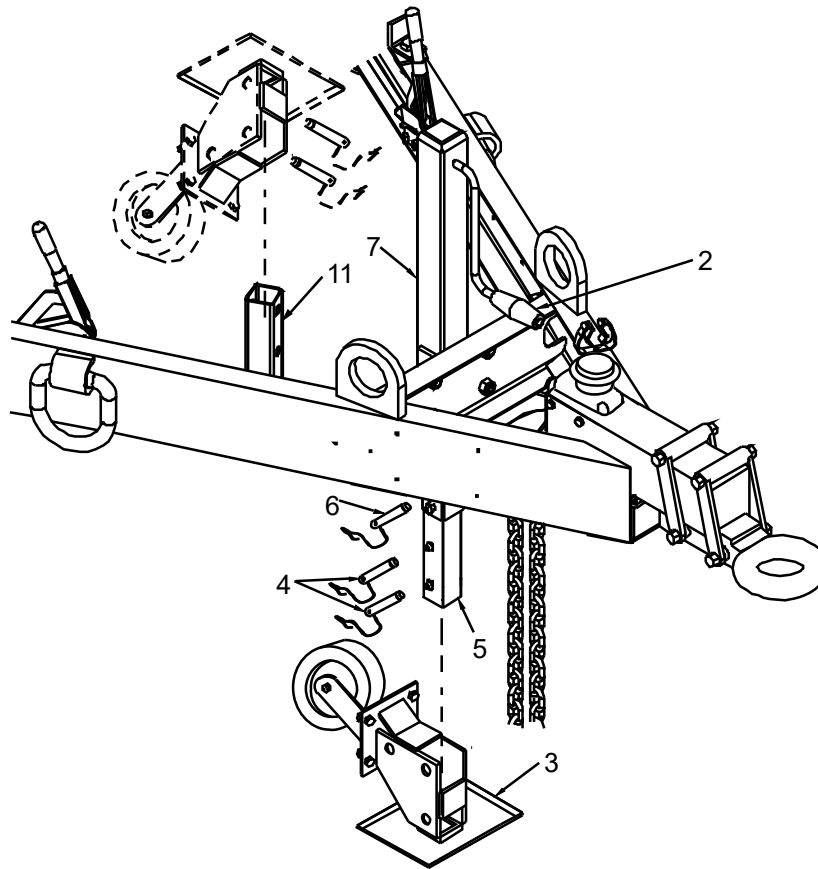


Figure 9. Secure Tongue Jack Assembly.

END OF TASK

Off-Road Driving Conditions

The HP-2C/185 trailer is equipped with a safety brake actuator device that is intended to keep the safety brakes from engaging when the vehicle is operating off-road.

CAUTION

During extreme off road transport, tire pressure should be reduced to 17 psi.
Failure to observe this warning could result in equipment damage.

NOTE

This procedure is to be used for all off road operation of the HP-2C/185 Trailer.

1. Ensure trailer lunette ring (Figure 10, Item 1) is level with towing vehicle.
2. Ensure safety chains (Figure 10, Item 4) are properly attached to towing vehicle.
3. Ensure safety breakaway cable (Figure 10, Item 2) is properly attached to towing vehicle.
4. Ensure rear stabilizer legs are properly stowed.
5. Ensure that trailer light cable is securely attached to the towing vehicle.
6. Ensure trailer tongue jack assembly (not shown) is properly stowed (failure to properly stow tongue jack assembly will result in damage to trailer tongue jack).
7. Ensure trailer handbrakes are disengaged.
8. Ensure all trailer cargo is secured.
9. Insert safety brake actuator lockout rod (Figure 10, Item 3) into the safety brake actuator lockout bore (Figure 10, Item 5), thus by-passing the trailer actuated braking system. (If trailer actuator is not pinned out, trailer actuated brakes may engage during extreme ascents and descents, causing damage to the trailer tongue)

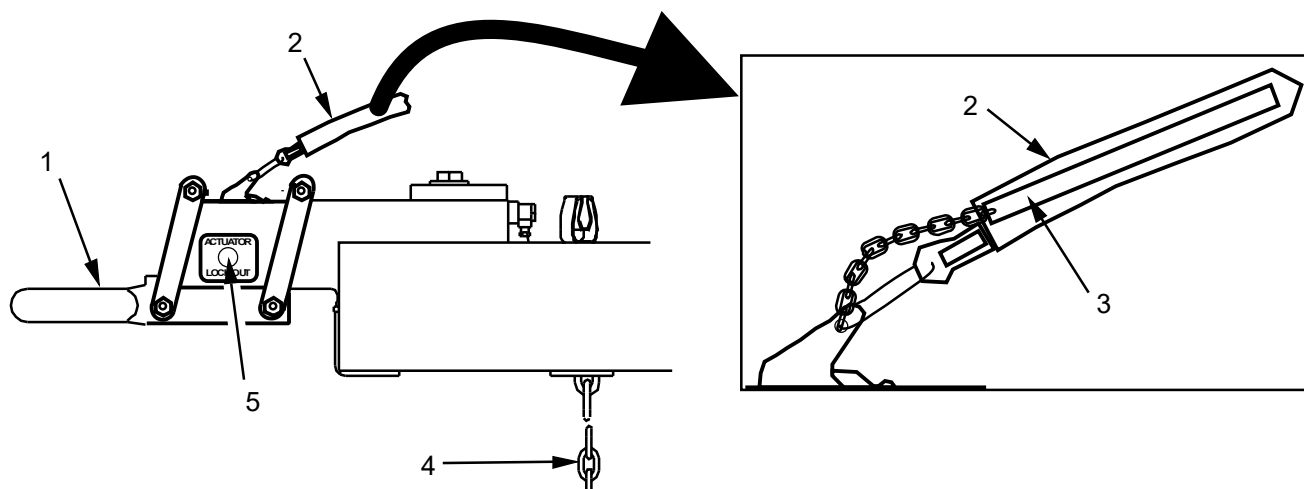


Figure 10. Trailer Safety Brake Lockout.

END OF TASK

Towing Instructions**NOTE**

Refer to FM 21-305 for further information on proper towing practices.

Driving.**CAUTION**

Sudden stops may cause drawbar to bend or buckle and may cause damage to hydraulic brake actuator assembly.

1. When the trailer is coupled, always start and stop the towed load slowly and gradually. Do this whether or not the trailer is loaded.
2. When driving a vehicle towing a trailer with a hydraulic brake actuator assembly, sudden and fast deceleration will cause the trailer hydraulic brakes to be applied.
3. Never exceed the maximum speed of 55 mph (88.5 km/h) highway or 20 mph (32.2 km/h) cross-country.
4. When driving the towing vehicle and trailer, the overall length of the unit must be kept in mind when turning and passing other vehicles. Because the unit is hinged in the middle, turning and backing are also affected. Heavier payloads will increase stopping distance and decrease off-road maneuverability.

END OF TASK**Turning.****CAUTION**

Tight turns may cause damage to hydraulic brake actuator assembly.

1. When turning corners, allow for the fact that the trailer wheels may turn inside the turning radius of the towing vehicle.
2. To make a right turn at an intersection, drive the towing vehicle partway into the intersection, then cut sharply to the right. This will allow for the turning radius of the trailer to keep its wheels off the curb.

END OF TASK**Backing.****CAUTION**

Always back the towing vehicle slowly and gradually.

1. Whenever possible, use an assistant driver or another person to act as a ground guide.
2. Adjust all towing vehicle rearview mirrors before backing.
3. When backing, the rear of the trailer will move in the opposite direction in which the towing vehicle is turned. When the towing vehicle is turned to the right, the rear of the trailer will go left. When the towing vehicle is turned and backing in a straight line is required, turn the towing vehicle in the direction the trailer is moving. This will slowly bring the towing vehicle and trailer into a straight line.

END OF TASK

Towing Instructions – Continued

Stopping. Always stop the towing vehicle by applying brakes gradually and smoothly. Do this whether or not the trailer is loaded.

CAUTION

Sudden stops may cause drawbar to bend or buckle and may cause damage to hydraulic brake actuator assembly.

END OF TASK

Parking. When the towing vehicle and the trailer are to be left unattended, set the trailer handbrakes, set the towing vehicle parking brakes, turn off the engine, and set wheel chocks.

END OF TASK**Preparation for Shipping**

1. Chock (Figure 11, Item 2) wheels once the trailer is positioned upon the transport vehicle.
2. Use skid plate (not wheel) to support tongue jack (Figure 11, Item 4) during shipping. The skid plate resting on the deck surface will support the tongue jack. The trailer tongue jack must be fully retracted.
3. Apply two handbrakes (Figure 11, Item 1).

CAUTION

Avoid hitting the retracted tongue jack when loading and unloading the trailer or damage will occur to the tongue jack.

4. Secure trailer to transport deck using the two tie-down rings (Figure 11, Item 3).
5. When traveling, the axle/suspension allows the trailer to move in an up and down motion. If extra tarpaulins are used to cover the trailer, they should be tied only to the trailer and not to the transport deck.

Towing Instructions – Continued

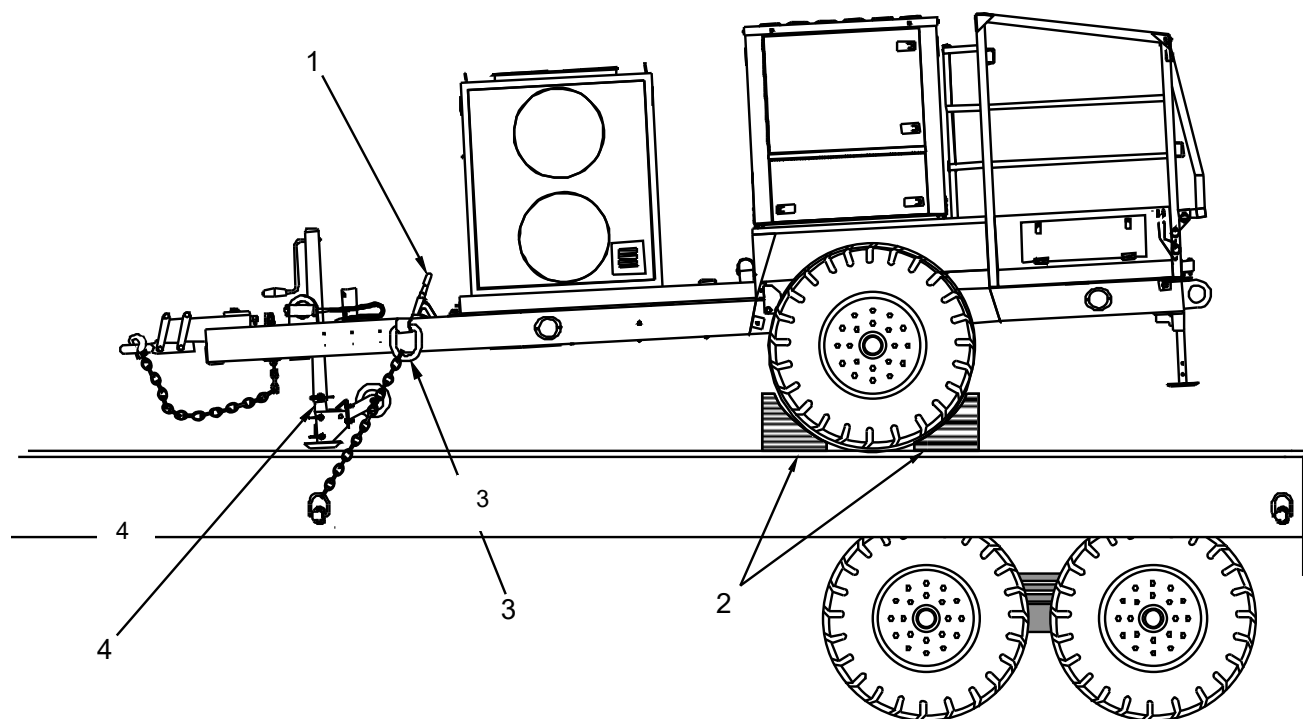


Figure 11. Trailer Properly Chocked and Positioned on Transport Trailer Deck.

END OF TASK

WEIGHT AND CENTER OF GRAVITY

The weight and Center of Gravity (CG) has been calculated using the fully loaded HP-2C/185 trailer. This information is useful when moving the unit with some lifting device (crane, tow truck, etc.). It gives the operator an idea of how to adjust slings for balancing the unit and for placement onto transportation equipment.

NOTE

CG is based on HP-2C/185 trailer being packed in accordance with On-Vehicle Equipment Loading Plan (WP 0009).

CG may vary slightly due to equipment movement during transport.

Refer to Figure 12 and Table 1 for information on weights, CG, and overall measurements of trailer for lifting, loading, and transport.

Table 1. Weight of HP-2C/185 Trailer.

ITEM	GROSS WEIGHT (LB)
HP-2C/185 Trailer (less payload)	3,500 lb (1,588 kg)
Cargo	700 lb (1.737 kg)
Total gross weight (trailer and cargo)	4,200 lb (1905 kg)
Tongue (with cargo)	420 lb (191 kg)

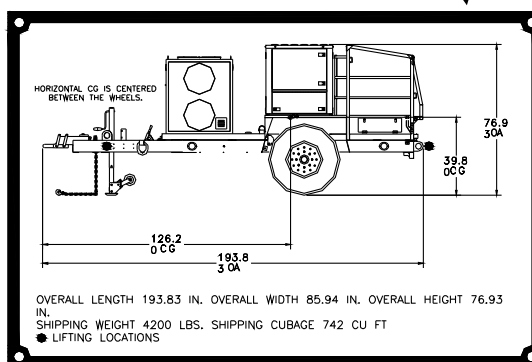
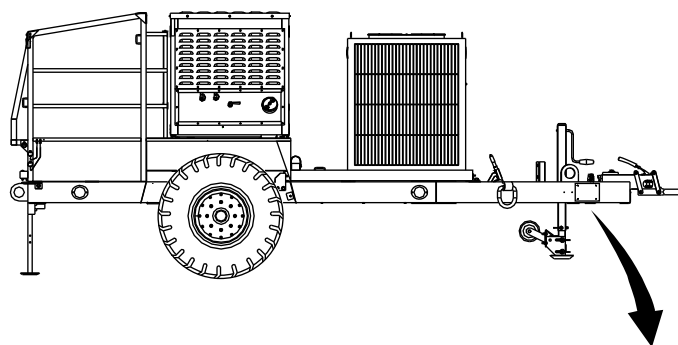


Figure 12. CG Tag Location on HP-2C/185 Trailer.

WEIGHT AND CENTER OF GRAVITY – Continued**NOTE**

Positive CG measurements for Figure 13 begin from the curbside corner of the HP-2C/185 trailer.

X - Begins at trailer pintle ring of the HP-2C/185 trailer and moves toward the trailer center.

Y - Begins at widest part of the HP-2C/185 trailer and moves toward the trailer center.

Z - Begins at lowest part of the HP-2C/185 trailer and moves toward the trailer center.

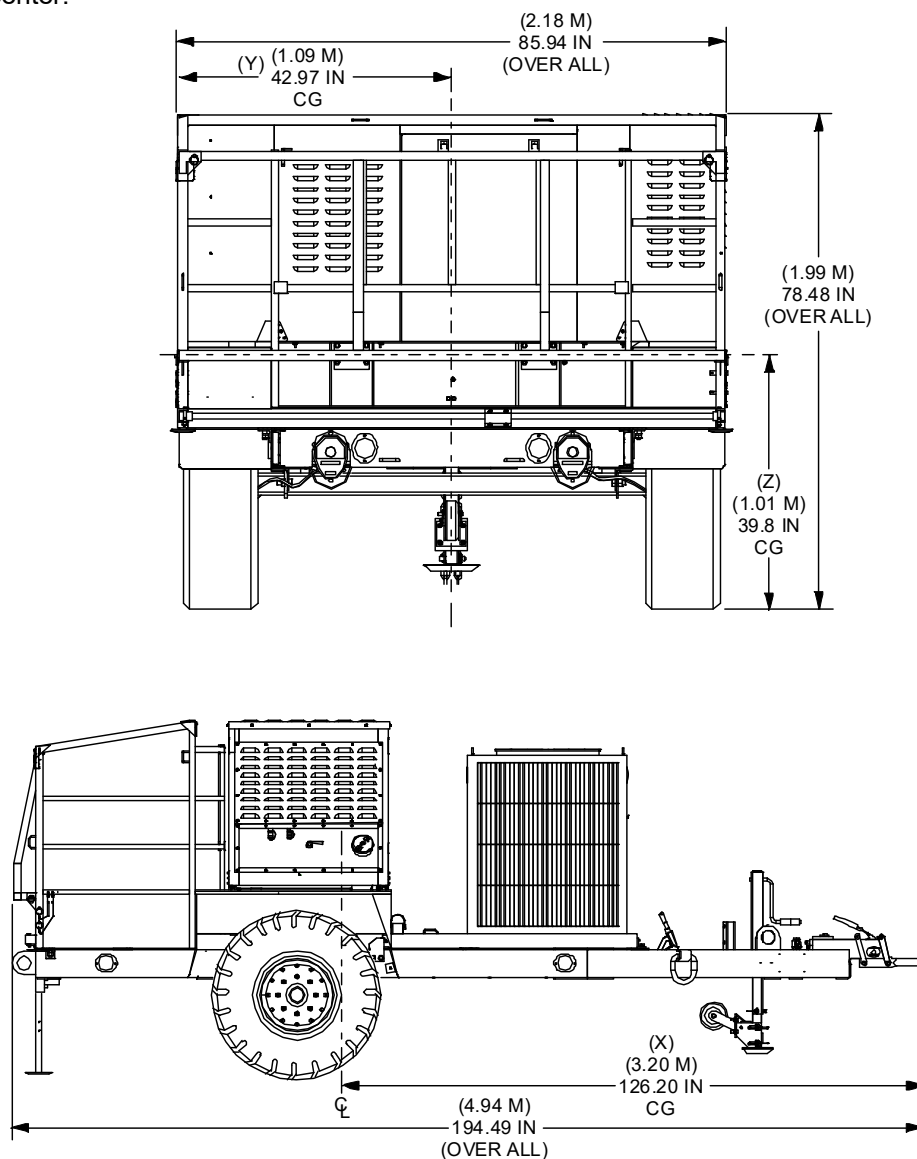


Figure 13. CG of HP-2C/185 Trailer.

END OF TASK

END OF WORK PACKAGE

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OPERATOR INSTRUCTIONS
HP-2C/185 UST Trailer
OPERATION UNDER UNUSUAL CONDITION

INITIAL SETUP:**Personnel Required**

Two

References

WP 0005, WP 0020, WP 0075,

GENERAL

This work package covers operating the HP-2C/185 UST Trailer system in arctic, tropical, and desert climates. This work package also describes off road towing of the trailer.

SECURITY MEASURES FOR ELECTRONIC DATA

Follow the security measures described in AR 25-2, Information Assurance, to control access to classified electronic data. For the HP-2C/185 UST Trailer system, follow the procedures described in the current version of the User Security Manual/Standard Operating Procedure (SOP).

UNUSUAL ENVIRONMENT/WEATHER**Arctic Climates****NOTE**

Refer to Engine Oil Recommendations (WP 0020, Table 1) for proper Genset oil viscosity in arctic climates.

Refer to Radiator Coolant to Water Ratios (WP 0075, Table 1) for proper Genset engine antifreeze to water ratios for arctic climates.

Sub zero temperatures and climatic conditions associated with cold weather affect the efficient operation of the equipment. Keep equipment as dry as possible. After the equipment has been exposed to the cold and is moved into a warm environment, moisture will collect on the trailer. Dry the external surfaces whenever possible. Follow the instructions and precautions below for operation under such adverse conditions.

Starting the Genset in Arctic Conditions

The Genset is equipped with an engine heater for warming the engine and a fuel heater to warm up the fuel prior to starting the engine in arctic climates.

CAUTION

The engine and fuel line heaters are not required when outside temperatures are above 0°F (-17.77°C).

1. Move Genset Control Panel FUEL LINE HEATER switch to the up position.
2. Move Genset Control Panel ENGINE HEATER switch to the up position.
3. Allow fuel line and engine heaters to operate for approximately 20 minutes before starting engine.
4. Refer to Genset Start Procedure, WP 0005.

Operation in Tropical Climates**NOTE**

Leaving the trailer inactive for long periods during rainy or humid conditions can cause rapid rust. Fungus may develop in the cargo box as well as in component storage bags. Frequent inspections, cleaning, and lubrication are necessary to maintain operational readiness of trailer.

Refer to Engine Oil Recommendations (WP 0020, Table 1) for proper Genset oil viscosity in tropical climates.

Refer to Radiator Coolant to Water Ratios (WP 0075, Table 1) for proper Genset engine antifreeze to water ratios for tropical climates.

High relative humidity causes condensation to form on the control panels whenever the temperature of the unit is lower than the surrounding air. To minimize this condition, provide as much ventilation as possible. Dry the unit control panel surfaces.

If engine overheating occurs:

1. Remove all electrical load on Genset, allowing engine to idle.
2. Observe coolant temperature gauge for steady cooling.

CAUTION

Stop engine if coolant temperature gauge suddenly increases beyond approximately 230°F (110°C). Failure to comply will result in damage to engine.

3. If engine coolant temperature continues to increase or does not lower, stop engine. Perform troubleshooting procedures in Chapter 3.

Desert Climates**NOTE**

Refer to Engine Oil Recommendations (WP 0020, Table 1) for proper Genset oil viscosity in desert climates.

Refer to Radiator Coolant to Water Ratios (WP 0075, Table 1) for proper Genset engine antifreeze to water ratios for desert climates.

Operating the Genset in dusty or sandy areas requires frequent servicing of air filters and cooling system fluids.

1. Frequently check air intake louvers. If air intake louvers become clogged and inoperable, stop engine and clean.
2. If engine overheating occurs:
 - a. Turn off all electric loads on Genset and allow engine to idle.
 - b. Observe engine coolant temperature gauge for steady cooling.

CAUTION

Stop engine if coolant temperature gauge suddenly increases beyond approximately 230°F (110°C). Failure to comply will result in damage to engine.

- c. If coolant temperature continues to increase or does not lower, stop engine. Perform applicable troubleshooting procedures in Chapter 3 or Chapter 5.

Trailers completing operation in dusty, sandy areas must be lubricated and serviced by service maintenance as soon as possible.

Extreme Heat**NOTE**

Refer to Engine Oil Recommendations (WP 0020, Table 1) for proper Genset oil viscosity in extreme heat.

Refer to Radiator Coolant to Water Ratios (WP 0075, Table 1) for proper Genset engine antifreeze to water ratios for extreme heat.

Extreme heat exists when ambient temperatures reach 95°F (35°C) or more. The effect of extreme heat on Genset is a decrease in engine efficiency.

Before Operation, perform the following:

1. Perform before operation checks and service.
2. Check for foreign objects in front of radiator and clean as required.
3. Frequently check coolant temperature gauge and oil pressure gauge. Engine is overheating if one or more of the following conditions exist:
 - a. Engine coolant temperature is more than approximately 230°F (110°C) as indicated by temperature gauge.
 - b. Engine oil pressure drops below approximately 15 psi (103 kPa) with engine under a load.

INTERIM NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION PROCEDURES

Contaminants are NBC agents that have been formulated to kill or to incapacitate human beings.

General Guidance**NOTE**

HP-2C/185 UST Trailer items rendered inoperable due to contamination do not need to be decontaminated and are to be discarded.

The HP-2C/185 UST Trailer is mission-critical. The system is compatible for use by Soldiers in Mission Oriented Protective Posture (MOPP) 4. Operators, using onboard equipment, must be able to conduct immediate decontamination within 15 minutes, operational decontamination using onboard or crew-served equipment within six hours, and thorough decontamination when mission allows reconstitution.

Immediate Decontamination (Equipment Only)

Per FM 3-5, operator spray-down/wipe-down should be done within 15 minutes. Operators use the M100 Sorbent Decontamination System (SDS) or the onboard M11/M13 decontamination apparatus to decontaminate surfaces that they must touch or contact to operate the equipment. Radiological contamination in the form of dust particles may be wiped, scraped, or brushed off.

Implementation. Decontamination of every surface that must be touched to operate the HP-2C/185 UST Trailer is handled in accordance with FM 3-5. The same procedures and actions are used for each item of equipment.

Likely Results. Systems incapable of withstanding decontamination are to be replaced. The HP-2C/185 UST Trailer operational capabilities and ease of maintenance become degraded but not destroyed. The remaining contaminated systems continue with the decontamination process.

Operational Decontamination**NOTE**

In the event that a system vital to the operational integrity of HP-2C/185 UST Trailer is contaminated but unlikely to survive the operational decontamination wash-down and contamination does not either hinder the operational ability of the system or pose a significant risk to the operators, operational decontamination should be delayed until such time as a replacement system is available.

Per FM 3-5, equipment wash-down should be performed within six hours of being contaminated when the mission does not permit a thorough decontamination. This process removes gross contamination and limits its spread.

Implementation. Every contaminated surface is washed down. The same procedures and actions are used for each item of equipment.

Likely Results. Under operational decontamination procedures, every contaminated system that was adequately and immediately decontaminated survives operational decontamination.

Thorough Decontamination

NOTE

In the event that a system vital to the operational integrity of HP-2C/185 UST Trailer is contaminated but unlikely to survive the Detailed Equipment Decontamination (DED) and contamination does not either hinder the operational ability of the system or pose a significant risk to the operators, operational decontamination should be delayed until such time as a replacement system is available.

Per FM 3-5, DED restores items so they can be used without MOPP gear. Normally, DED is conducted as part of a reconstitution or during breaks in combat operations. This operation requires support from a chemical decontamination unit.

Implementation. The chemical decontamination unit conducts a DED when the tactical situation permits. The same procedures and actions are used for each item of equipment.

Likely Results. Under thorough decontamination procedures, every system that was adequately and operationally decontaminated survives thorough decontamination.

RADIOACTIVE DECONTAMINATION PROCEDURES

NOTE

The following is only a brief guideline. Complete information may be found in DA PAM 700-48.

Obtain assistance from medical personnel if decontamination of eyes, ears, nose, or mouth is necessary.

General

Commanders must appoint a Radiation Safety Officer/Radiation Protection Officer/Radiation Protection Staff Officer/ Radiation Control Officer (RSO/RPO/RPSO/RCO) at the appropriate unit level. Personnel handling Radiologically Contaminated Equipment (RCE) incur a risk of exposure to and contamination from radioactive materials. Proper radiation safety oversight is essential to minimize personnel exposure potential and to ensure proper follow-up after the incident is over. In addition to the precautions outlined in this pamphlet, personnel handling RCE ensure trained personnel conduct radiation safety monitoring. Such monitoring includes as a minimum, surveys of personnel and equipment used and bioassays to document any exposure by RCE handler.

General Decontamination Procedure

The specific decontamination methods and procedures selected for use in particular circumstances depend on the type, extent, and location of the contamination. However, the general approach to decontamination outlined below applies to most situations.

1. Always perform decontamination under the direction of radiation safety personnel.
2. Control access to contaminated areas.
3. Provide protection, including appropriate clothing, for workers.
4. Evaluate what is to be decontaminated.
5. Obtain necessary equipment and materials.
6. Survey all items to be released to an unrestricted area.

General Decontamination Procedure - Continued

7. Begin with the mildest decontamination method and progress to harsher, more abrasive, or caustic methods as required.
8. Work from the outside of the contaminated area to the inside.
9. Isolate all clean areas from contaminated areas. Cover clean areas adjacent to those being decontaminated with taped down paper, plastic, or other disposable material to prevent recontamination.
10. Minimize the generation of contaminated liquids and airborne radioactivity during the work. Collect and treat as contaminated waste all liquids generated and materials used during decontamination operations.
11. Survey items between major steps in the decontamination process.
12. Continue decontamination until contamination levels are reduced to appropriate levels as per DA PAM 700-48.
13. Document the completion of decontamination, including the name of the individual performing the final survey, the date, and the survey results. Utilize DA Forms 7399-R, 7400, and 7401. These forms are available on the Army Electronic Library CD-ROM and the USAPA website.

Personnel Decontamination

Before external decontamination of an individual is begun, the following steps should be taken to help establish priorities for decontamination and follow-up effort.

1. Observe any physical effects on the contaminated person (i.e., bleeding, irregular breathing, burns, or shock).
2. Assess the extent of any injuries. Medical treatment of injuries takes priority over decontamination.
3. Determine the extent and magnitude of contamination using personnel survey techniques.
4. Document survey results on DA Form 7399.
5. Remove contaminated clothing, place it in a plastic bag, and hold it for further disposition.
6. Obtain assistance from medical personnel if decontamination of eyes, ears, nose, or mouth is necessary.
7. Personnel should be decontaminated as quickly as possible using the least drastic means necessary.
8. Decontamination methods should begin with mild methods, which should be continued as long as they are effective, and progress to harsher methods only as required.
9. Extreme care should be taken to prevent the spread of contamination to any skin or body opening.
10. All liquids generated and materials used during decontamination should be collected and treated as contaminated waste.
11. Personnel performing the decontamination should take all necessary precautions to protect themselves.

12. Cool or lukewarm water should be used for all washing and rinsing. Hot water causes the skin pores to open, driving contamination deeper into the skin. Cold water closes the pores, trapping contamination in the skin.

Specific Personnel Decontamination Methods

NOTE

In all cases of personnel contamination, the RPO must be consulted. If ingestion or inhalation of radioactive material is suspected, bioassays should be performed.

1. Thorough washing with nonabrasive soap and lukewarm water is the best general method of decontaminating the hands and other parts of the body. If the contaminant is localized, it is often more practical to mask off the affected area and cleanse with swabs rather than risk the danger of spreading the contaminant by general washing. Organic solvents must be avoided as decontaminating agents because they may increase the probability of the radioactive materials penetrating through the pores of the skin. Special attention must be given to the areas between the fingers and around the nails. The outer edges of the hands are easily contaminated and must not be neglected in the washing.
2. After repeated washings, the skin may tend to chap. To avoid this, apply lanolin or hand cream and then continue to wash. If repeated washing with soap and water is unsuccessful in the personnel decontamination, the individual should be referred to the local medical officer for application of the more drastic chemical decontamination.
3. In the event several individuals have become contaminated or the contamination on an individual is not localized to a small portion of the body, the following decontamination procedure is recommended.
 - a. Place individual in a lukewarm shower.
 - b. Using a mild soap, individual should cover entire body with lather.
 - c. While still covered with lather, individual should step out of shower.
 - d. Sprinkle a heavy coat of mild soap flakes all over lathered individual (purpose of lather is to cause soap flakes to adhere to person).
 - e. Using hands, the contaminated individual rubs the soap flakes on the body into a paste.

NOTE

It is necessary for the contaminated individual to rub body surfaces with their hands while rinsing in order to remove soap paste. Soap paste remains on those areas that have not been thoroughly washed. Although a soft cloth may be used, a brush may not. Particular attention should be given to hairy portions of the body.

- f. The contaminated individual returns to shower and rinses soap off the body by starting at the top and working downward.
- g. When the individual has rinsed to the point that the individual no longer feel slimy and while still under shower, the individual should be examined by an assistant for traces of soap. The presence of soap indicates which areas of the body have not been decontaminated.
- h. After removing all traces of soap, the individual should leave the shower and dry the body.

Specific Personnel Decontamination Methods - continued

- i. After drying off, the individual must be monitored. If still contaminated, repeat above procedures. In the event residual contamination is localized, repeat decontamination procedures to those areas still showing contamination.

Equipment and Material Decontamination**NOTE**

Contaminated soil around accident and water runoff should be scraped up and containerized for removal as radioactive waste.

Materials that cannot be easily or cost-effectively decontaminated should be evaluated for possible disposal as radioactive waste. Porous items (e.g., wood, paper, cloth), intricately designed equipment, and items of low replacement cost tend to fall in this category. If decontamination of equipment and/or materials is required, many cleaning, abrasive, chemical, and electrochemical methods are available. Listed here are a few of the simpler and least costly methods. These methods should be repeated until surveys indicate the need for harsher methods. Under no circumstances is dry sweeping of radioactive contamination allowed. Appropriate Personal Protection Equipment (PPE) must be worn.

- Place masking, adhesive, friction, or duct tape over the contaminated area; remove. When removed, discard as radioactive waste.
- Use vacuum-cleaning techniques with a conventional wet or dry vacuum cleaner modified to include a High-Efficiency Particulate Air (HEPA) filter on the exhaust. Dispose of bag or collection container as radioactive waste. Respiratory protection must be used. **If a HEPA filter is not available, do not vacuum.**
- Wipe or wet mop using a decontaminating agent or detergents and hot water.

JAMMING AND ELECTRONIC COUNTERMEASURES (ECM) PROCEDURE

The HP-2C/185 UST Trailer system is not subject to jamming.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS
HP-2C/185 UST Trailer
EMERGENCY SHUTDOWN PROCEDURES

INITIAL SETUP:

Personnel Required
One

Equipment Condition
Equipment ON

References
WP 0004

GENERAL

This work package contains procedures for the emergency shutdown of the various pieces of equipment of the HP-2C/185 UST Trailer. Refer to Description and Use of Operator Controls, Indicators, and Connectors (WP 0004) for more information about the location and function of controls, indicators, and connectors.

EMERGENCY SHUTDOWN PROCEDURES**Emergency Genset Operation**

A Battle Short Switch on the Genset Control Panel is used when the Genset must remain running regardless of operating conditions. The BATTLE SHORT switch overrides any automatic system shutdown protection devices (such as low oil pressure, high water temperature) to keep the Genset operating.

1. Lift up the BATTLE SHORT switch cover on the Genset Control Panel.
2. Move the BATTLE SHORT switch to UP position.

To disengage the Battle Short Override, close the BATTLE SHORT switch cover by pressing down. Closing the switch cover will turn off the BATTLE SHORT switch.

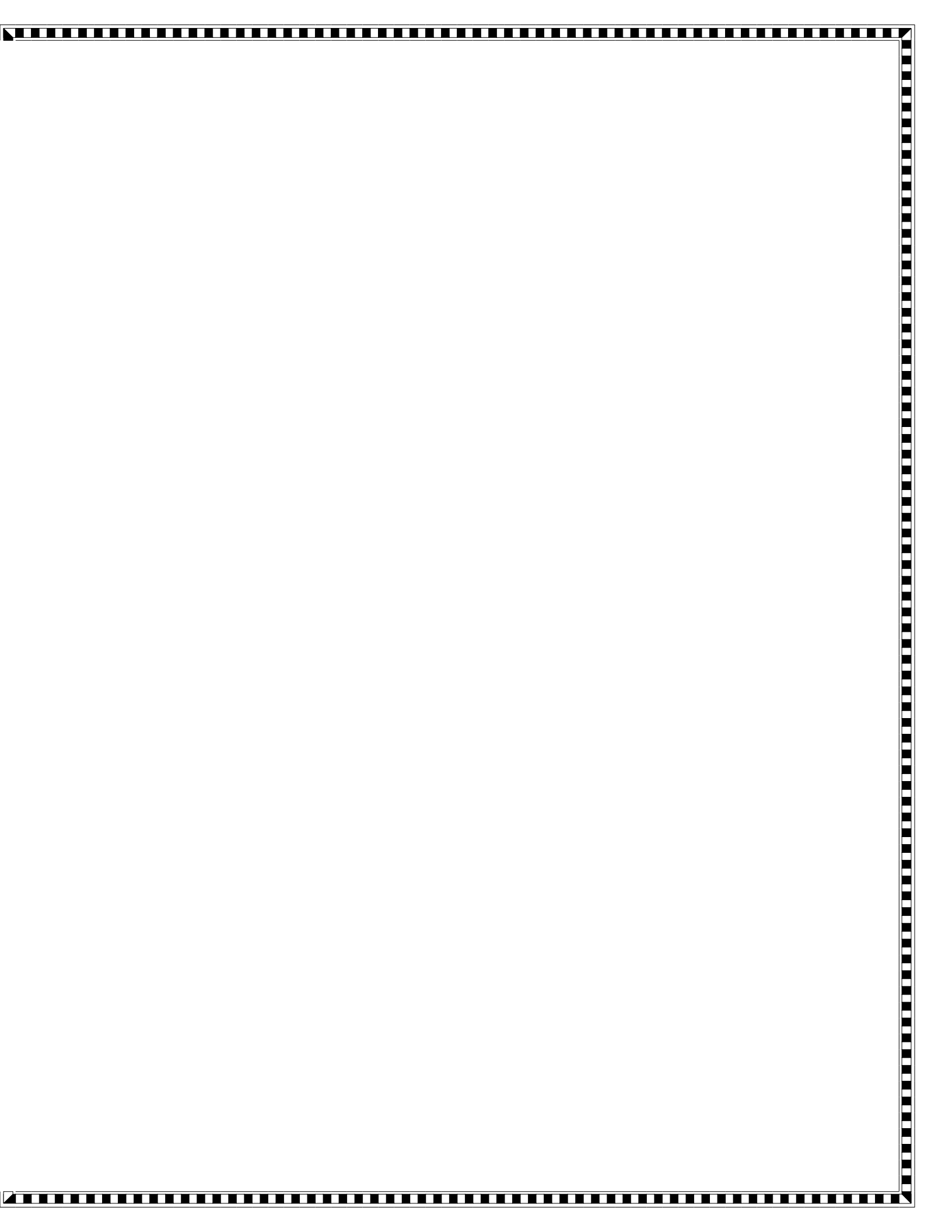
Emergency Power Down of Genset

1. Press the EMERGENCY STOP button on the Circuit Breaker Panel to immediately terminate all power from the Genset.
2. After shutdown, set all circuit breakers on the Circuit Breaker Panel and ECU control panel to the OFF position.

Emergency Power Down of ECU

1. If the ECU is running on power from the Genset, press EMERGENCY STOP on the Genset Circuit Breaker Panel to immediately stop all power to the ECU.
2. If the ECU is running on an external power source (i.e., shore power), set MODE SELECT switch on the ECU Control Panel to OFF to stop the unit.

END OF WORK PACKAGE



OPERATOR INSTRUCTIONS
HP-2C/185 UST Trailer
STOWAGE AND DECAL/DATA PLATE GUIDE

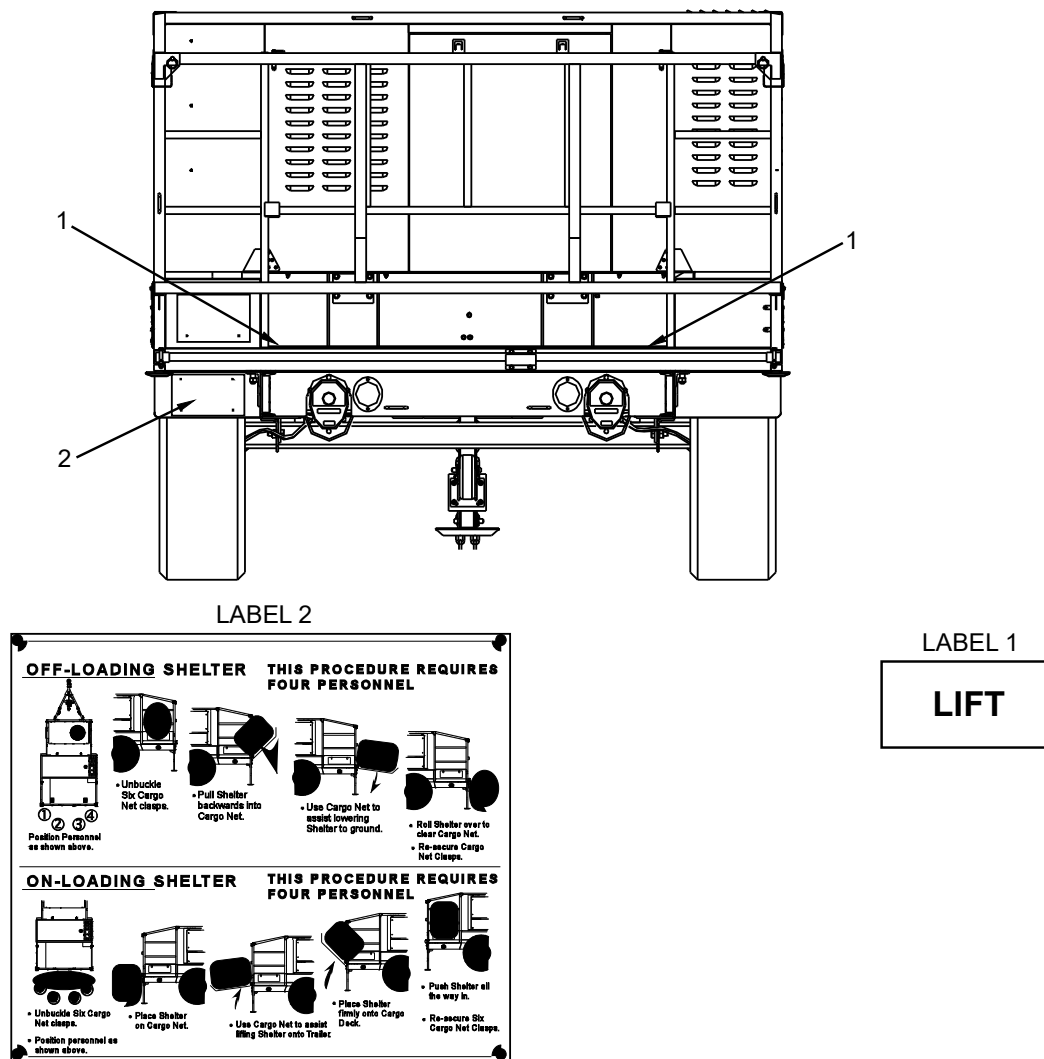
TRAILER

Figure 1. Location of Identification and Data Plates on Trailer Rear.

Table 1. Identification and Data Plates on Trailer Rear.

LABEL	DESCRIPTION
1	Stencil – Identifies location of proper Lift point on trailer.
2	Instruction plate – Black with white text. Informs user of procedure required to unload shelter from trailer bed.

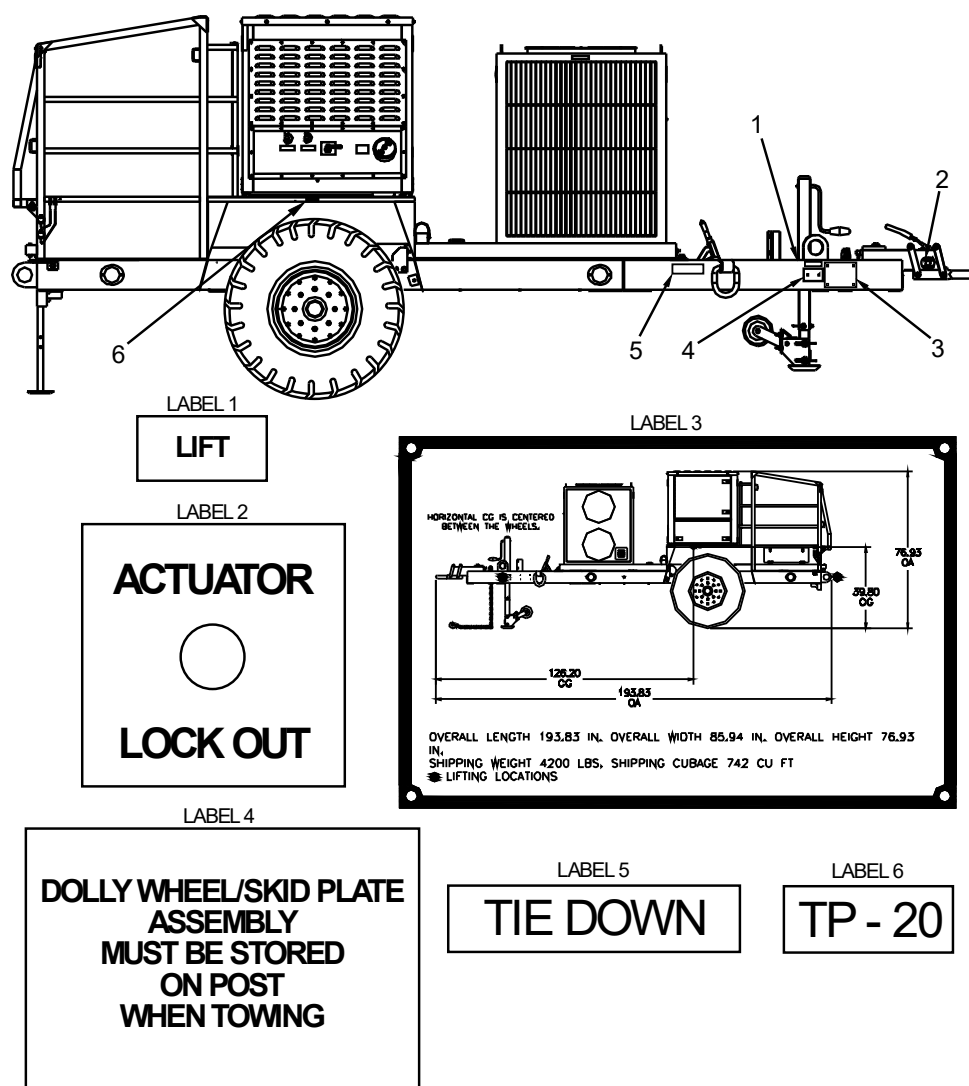
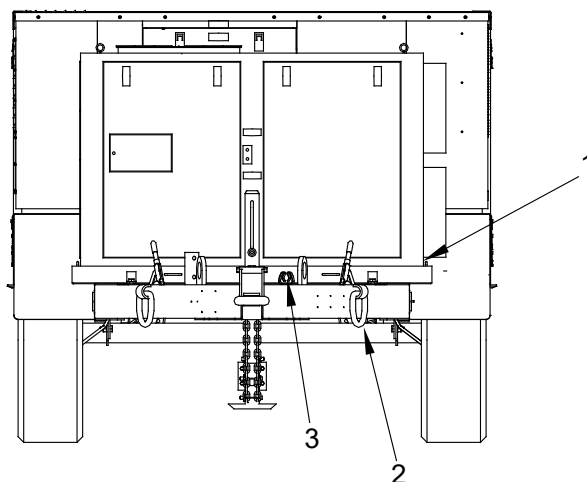


Figure 2. Location of Identification and Data Plates on Trailer Curbside.

Table 2. Identification and Data Plates on Trailer Curbside.

LABEL	DESCRIPTION
1	Stencil – Identifies location of proper Lift point on trailer.
2	Instruction plate – Black with white text. Informs user of Actuator Lock Out.
3	Shipping instruction plate - Black with white text. Provides overall dimensions and Center of Gravity data required for lifting and shipping.
4	Instruction plate – Black with white text. Informs user of proper location/storage of dolly wheel/skid plate during transport of trailer.
5	Stencil – Identifies location of proper Tie Down point on trailer.
6	Instruction plate – Black with white text. Informs user of tire pressures required.



LABEL 1

CAUTION: FOR BEST OPERATING PERFORMANCE, LEVEL THE TRAILER BEFORE START UP. THE BUBBLE SHOULD BE TOUCHING THE RING (MIN).

LABEL 2

MANUFACTURED BY:

DATE CVWR

GAWR ALL AXLES

WITH TIRES AT

PSI COLD WITH RIMS.

VIN

LABEL 3

CARC

Figure 3. Location of Identification and Data Plates on Trailer Front.

Table 3. Identification and Data Plates on Trailer Front.

LABEL	DESCRIPTION
1	Caution plate - Red with white text. Warns user of importance of trailer being level before operating system.
2	Vehicle Identification Plate – Black with white text. Provides VIN, Model number, weight, and other pertinent data about the trailer.
3	CARC stenciling – Reminds personnel of presence of CARC paint.

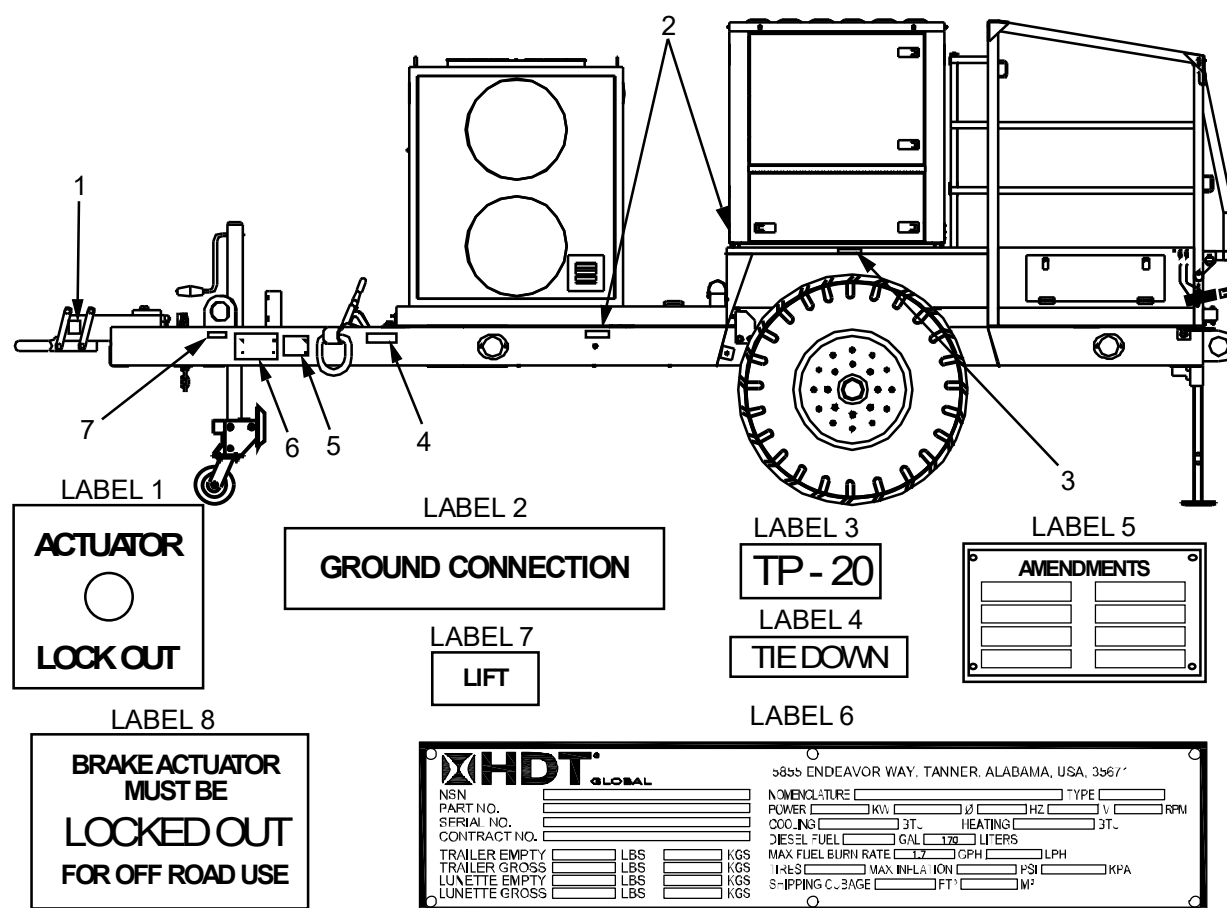


Figure 4. Location of Identification and Data Plates on Trailer Roadside.

Table 4. Identification and Data Plates on Trailer Roadside.

LABEL	DESCRIPTION
1	Instruction plate – Black with white text. Informs user of Actuator Lock Out.
2	Instruction plate – Black with white text. Informs user of system ground connection location on trailer.
3	Instruction plate – Black with white text. Informs user of tire pressures required.
4	Stencil – Identifies location of proper Tie Down point on trailer.
5	Amendment Plate - Black with white text. Provides information regarding modifications to system.
6	Vehicle Identification Plate – Black w/white text. Provides VIN, Model number, weight, and other pertinent data about the HP-2C/185 UST Trailer.
7	Stencil – Identifies location of proper Lift point on trailer.
8	Instruction plate – Red with white text. Informs user of Actuator Lock Out.

ECU

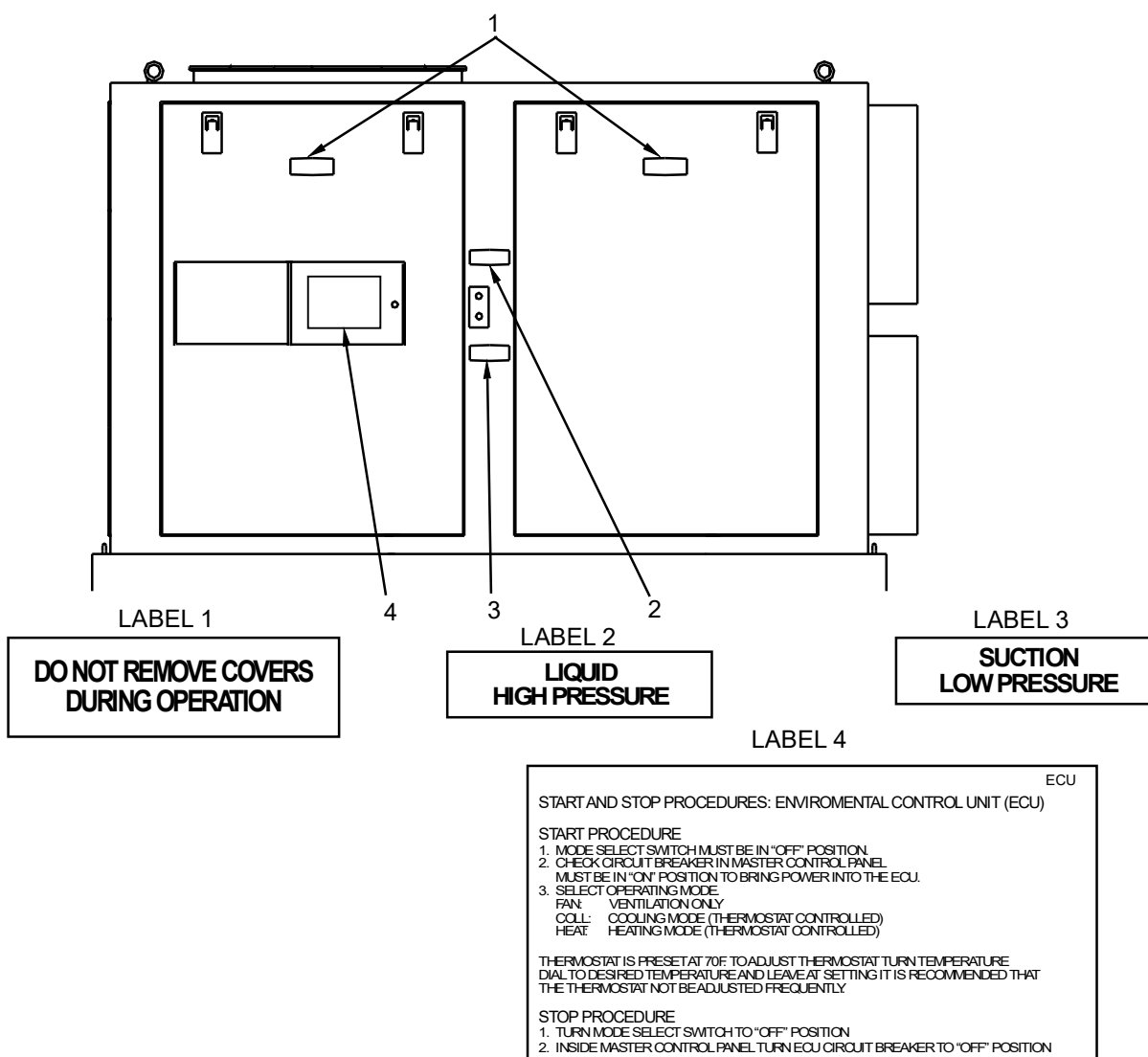


Figure 5. Location of Identification and Data Plates on ECU Front.

Table 5. Identification and Data Plates on ECU Front.

LABEL	DESCRIPTION
1	Warning plate - Red with white text. Warns user not to remove access cover during operation of ECU.
2	Instruction plate – Red with white text. Informs user of high pressure connection on ECU.
3	Instruction plate – Red with white text. Informs user of low pressure connection on ECU.
4	Instruction plate – Black with white text. Instructs user on operational procedures for the ECU.

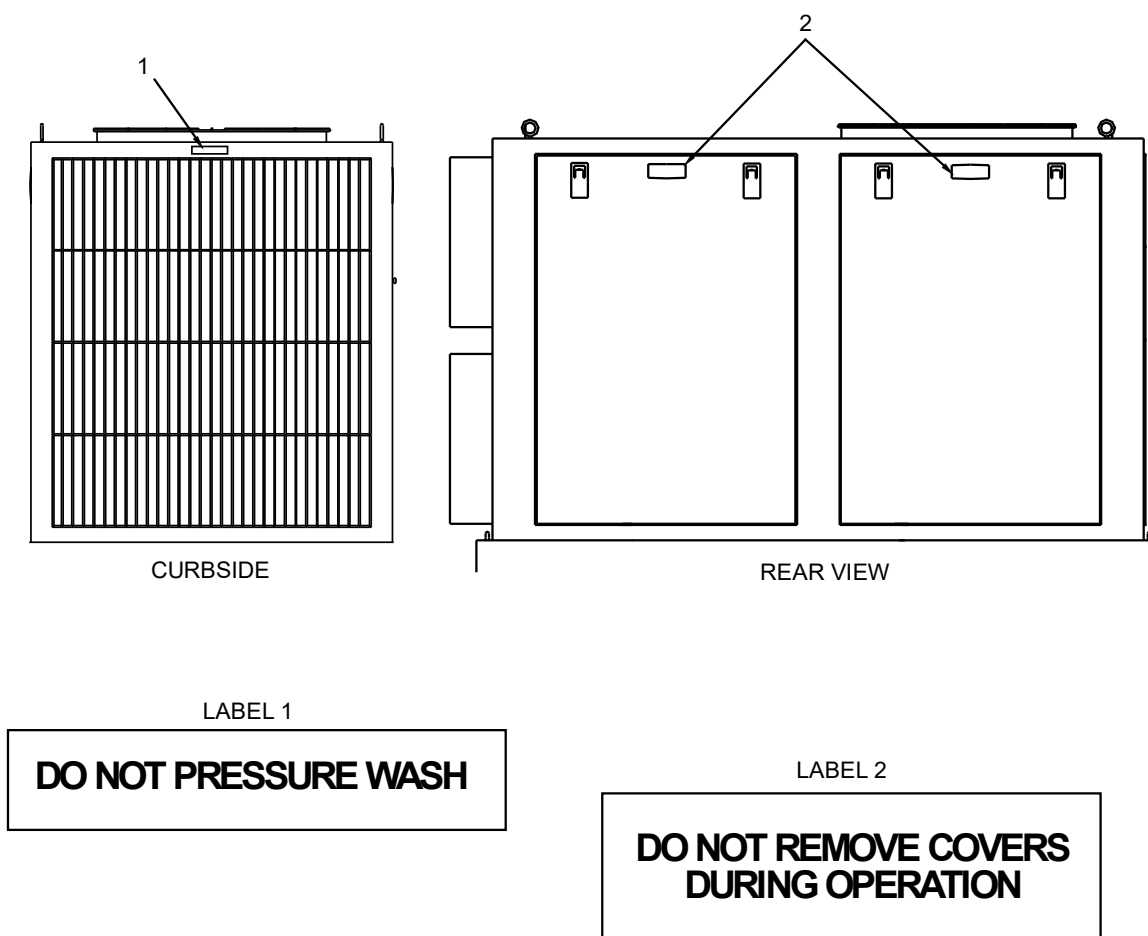


Figure 6. Location of Identification and Data Plates on ECU Curbside and Rear.

Table 6. Identification and Data Plates on ECU Curbside and Rear.

LABEL	DESCRIPTION
1	Instruction plate – Black with white text. Informs user not to pressure wash ECU fins.
2	Warning plate – Red with white text. Warns user not to remove access cover during operation of ECU.

GENSET

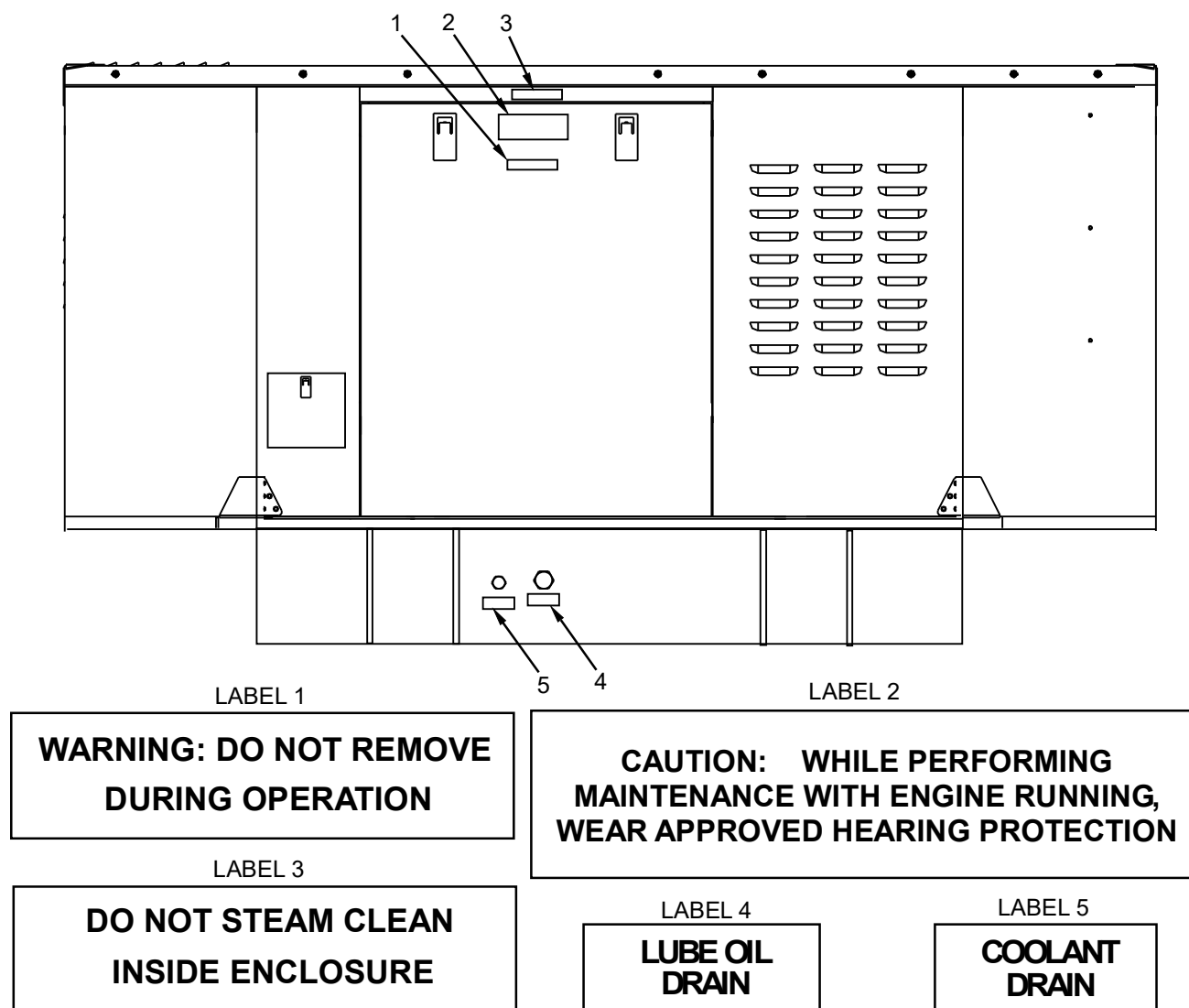


Figure 7. Location of Identification and Data Plates on Genset Front.

Table 7. Identification and Data Plates on Genset Front.

LABEL	DESCRIPTION
1	Warning plate - Red with white text. Warns user not to remove access cover during operation of Genset.
2	Caution plate – Black with white text. Reminds user to wear appropriate protection equipment when Genset is operational.
3	Instruction plate – Black with white text. Informs user not to steam clean engine.
4	Instruction plate – Black with white text. Informs user of Genset lube oil drain plug.
5	Instruction plate – Black with white text. Informs user of location of Genset coolant drain plug.

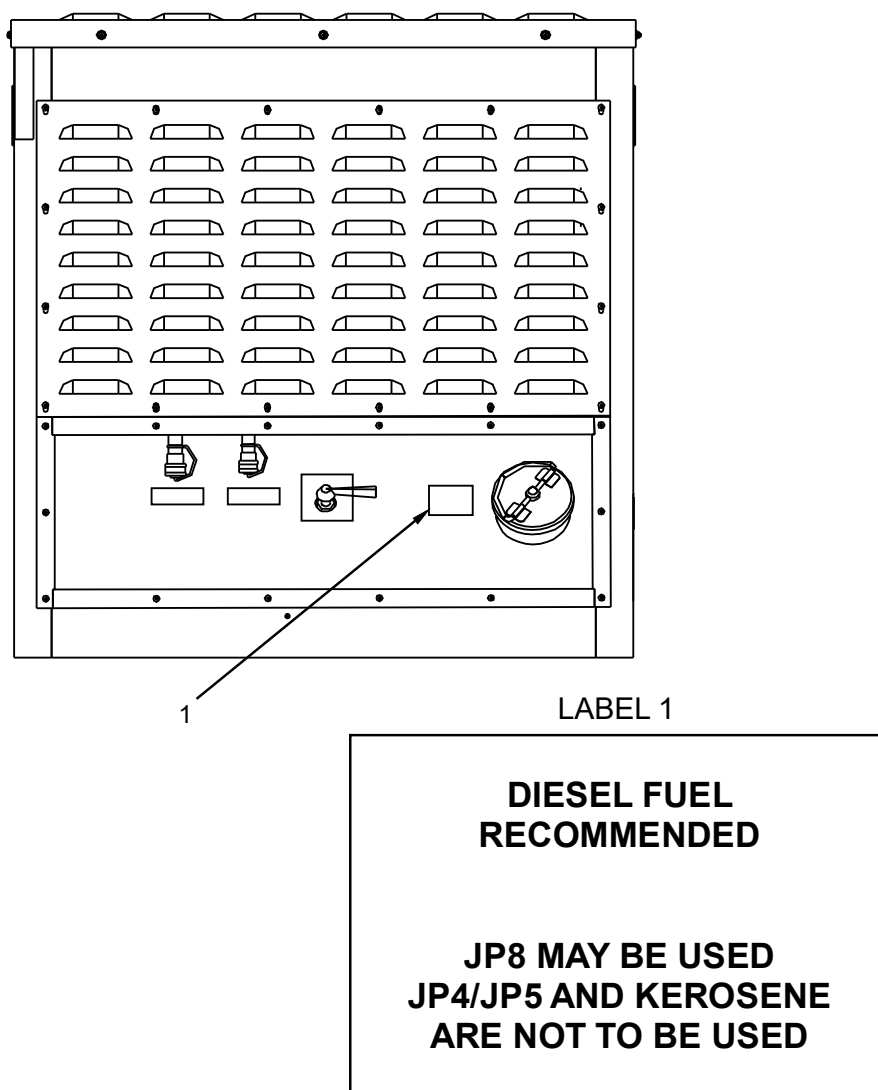
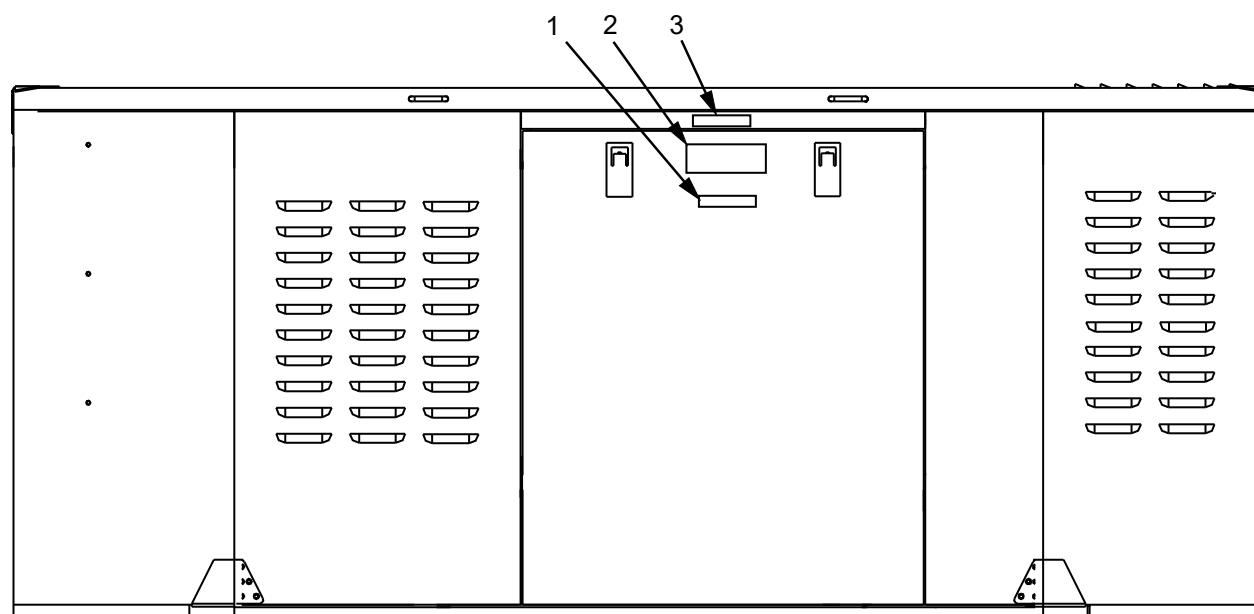


Figure 8. Location of Identification and Data Plates on Genset Curbside.

Table 8. Identification and Data Plates on Genset Curbside.

LABEL	DESCRIPTION
1	Instruction plate – Black with white text. Informs user of fuel used by Genset.



LABEL 1

**WARNING: DO NOT REMOVE
DURING OPERATION**

LABEL 3

**DO NOT STEAM CLEAN
INSIDE ENCLOSURE**

LABEL 2

**CAUTION: WHILE PERFORMING
MAINTENANCE WITH ENGINE RUNNING
WEAR APPROVED HEARING PROTECTION**

Figure 9. Location of Identification and Data Plates on Genset Rear.

Table 9. Identification and Data Plates on Genset Rear.

LABEL	DESCRIPTION
1	Warning plate - Red with white text. Warns user not to remove access cover during operation of Genset.
2	Caution plate – Black with white text. Reminds user to wear appropriate protection equipment when Genset is operational.
3	Instruction plate – Black with white text. Informs user not to steam clean engine.

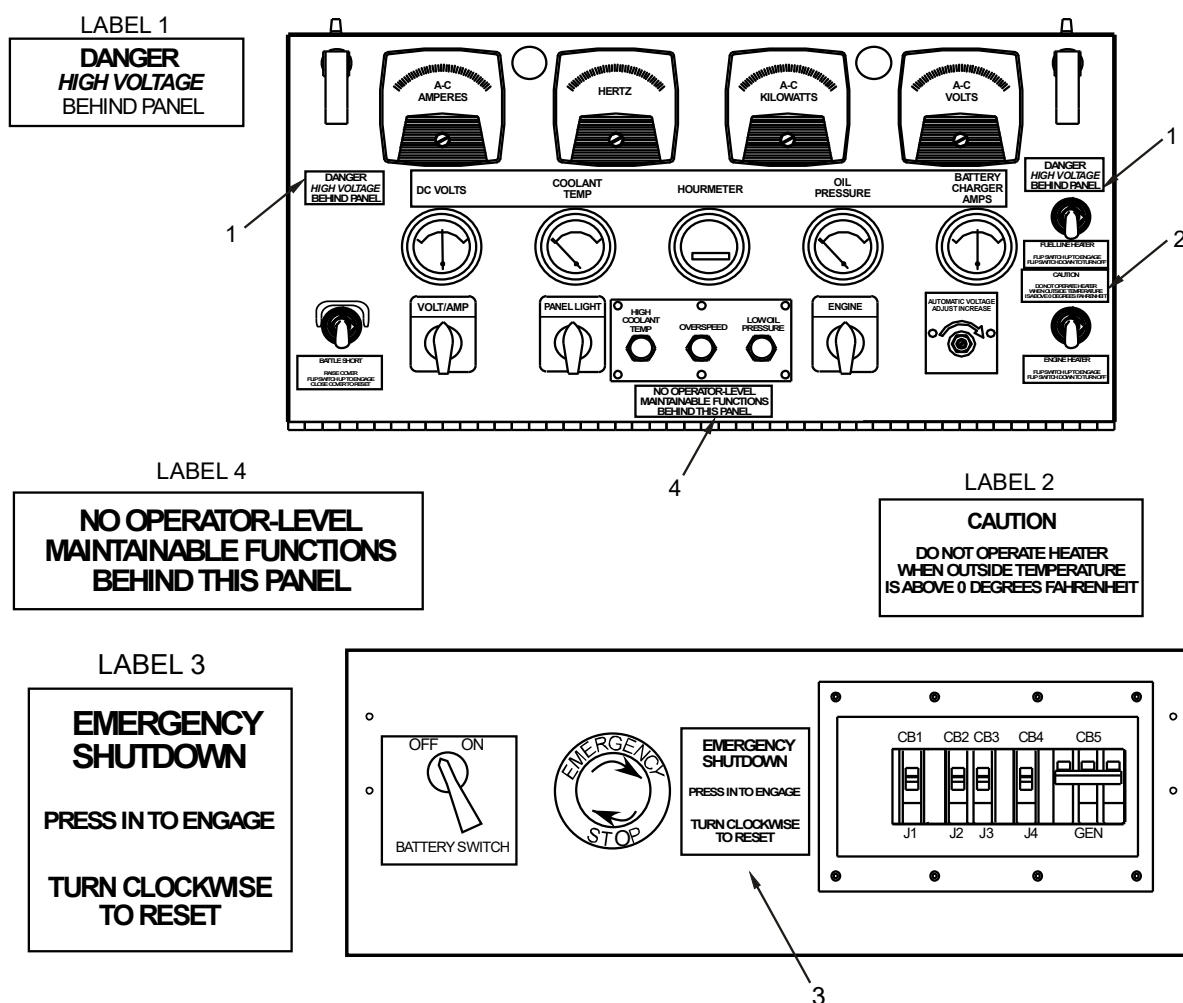
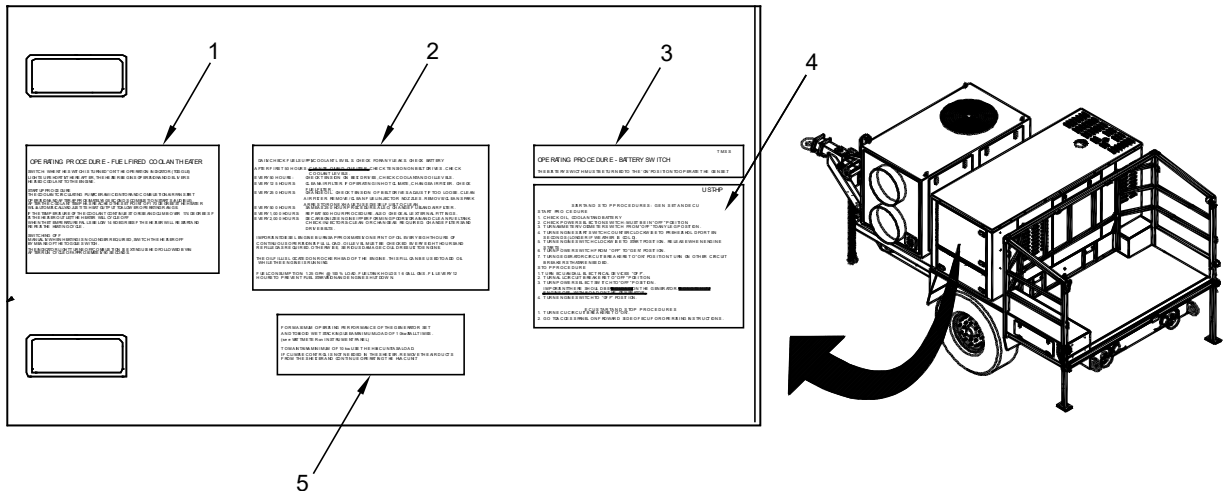


Figure 10. Location of Identification and Data Plates on Genset Control Panel and Circuit Breaker Panel.

Table 10. Identification and Data Plates on Genset Control Panel and Circuit Breaker Panel.

LABEL	DESCRIPTION
1	Warning plate – Red with white text. Informs user of presence of high voltage.
2	Warning plate – Red with white text. Informs user that heater should not be operated when temperature is above 0° F (-17.77°C).
3	Instruction plate – Red with white text. Instructs user on emergency shut down of Genset.
4	Warning plate – Red with white text. Informs user that no crew maintenance present behind control panel.



LABEL 1

OPERATING PROCEDURE - FUEL FIRED COOLANT HEATER

SWITCH: WHEN THE SWITCH IS TURNED "ON" THE OPERATION INDICATOR (TOGGLE) LIGHTS UP. SHORTLY THEREAFTER, THE HEATER BEGINS OPERATION AND DELIVERS HEATED COOLANT TO THE ENGINE.

STARTUP PROCEDURE

THE COOLANT CIRCULATING PUMP, CERAMIC IGNITOR AND COMBUSTION AIR FAN START OPERATION AND AFTER APPROXIMATELY 60 SECONDS COMBUSTION STARTS (AUDIBLE). AFTER THE COOLANT TEMP HAS REACHED THE SET POINT OF 170 DEGREES THE HEATER WILL AUTOMATICALLY ADJUST ITS HEAT OUTPUT TO A LOWER OPERATING RANGE. IF THE TEMPERATURE OF THE COOLANT CONTINUES TO RISE AND CLIMB OVER 174 DEGREES F AT THE HEATER OUTLET, THE HEATER WILL CYCLE OFF. WHEN THE TEMPERATURE FALLS BELOW 149 DEGREES F THE HEATER WILL RESTART AND REPEAT THE HEATING CYCLE.

SWITCHING OFF

MANUALLY: WHEN HEATING IS NO LONGER REQUIRED, SWITCH THE HEATER OFF BY MEANS OF THE TOGGLE SWITCH. THE INDICATOR LIGHT TURNS OFF. COMBUSTION IS EXTINGUISHED FOLLOWED BY AN AFTER RUN CYCLE OF APPROXIMATELY 90 SECONDS.

LABEL 2

TMSS-MED

DAILY: CHECK FUEL SUPPLY, COOLANT LEVELS, CHECK FOR ANY LEAKS, CHECK BATTERY.
 AFTER FIRST 50 HOURS: **CHANGE OIL AND OIL FILTER**, CHECK TENSION ON BELT DRIVES, CHECK COOLANT LEVELS.
 EVERY 50 HOURS: CHECK TENSION ON BELT DRIVES, CHECK COOLANT AND OIL LEVELS.
 EVERY 125 HOURS: CLEAN AIR FILTER. IF OPERATING IN HOT CLIMATE, CHANGE AIR FILTER. CHECK FUEL FILTER.
 EVERY 250 HOURS: CHANGE OIL, CHECK TENSION OF BELT DRIVES, ADJUST IF TOO LOOSE. CLEAN AIR FILTER. REMOVE/ CLEAN FUEL INJECTOR NOZZLES. REMOVE/ CLEAN SPARK ARRESTOR ON EXHAUST. USE DIESEL FUEL TO CLEAN.
 EVERY 500 HOURS: SAME AS 250 HOUR PROCEDURE. ALSO, CHANGE FUEL AND AIR FILTER.
 EVERY 1,000 HOURS: REPEAT 500 HOUR PROCEDURE. ALSO CHECK ALL EXTERNAL FITTINGS.
 EVERY 2,000 HOURS: DECARBONIZE ENGINE IF PERFORMING POORLY. DRAIN AND CLEAN FUEL TANK. CHECK INJECTORS, CLEAN OR CHANGE AS REQUIRED. CHANGE FILTERS AND DRIVE BELTS.

IMPORTANT: DIESEL ENGINE BURNS APPROXIMATELY ONE PINT OF OIL EVERY EIGHT HOURS OF CONTINUOUS OPERATION AT FULL LOAD. OIL LEVEL MUST BE CHECKED EVERY EIGHT HOURS AND REFILLED AS REQUIRED. OTHERWISE, SERIOUS DAMAGE COULD RESULT TO ENGINE.

THE OIL FILL IS LOCATED ON ROCKER HEAD OF THE ENGINE. THIS FILL CAN BE USED TO ADD OIL WHILE THE ENGINE IS RUNNING.

FUEL CONSUMPTION: 1.25 GPH @ 100% LOAD. FUEL TANK HOLDS 16 GALLONS. FILL EVERY 12 HOURS TO PREVENT FUEL STARVATION AND ENGINE SHUTDOWN.

LABEL 3

TMSS

OPERATING PROCEDURE - BATTERY SWITCH

THE BATTERY SWITCH MUST BE TURNED TO THE "ON" POSITION TO OPERATE THE GENSET.

LABEL 4

UST-HP

START AND STOP PROCEDURES: GEN SET AND ECU**START PROCEDURE**

1. CHECK OIL, COOLANT AND BATTERY.
 2. CHECK POWER SELECTION SWITCH. MUST BE IN "OFF" POSITION.
 3. TURN AMMETER/VOLTMETER SWITCH FROM "OFF" TO ANY LEG POSITION.
 4. TURN ENGINE START SWITCH COUNTERCLOCKWISE TO PREHEAT. HOLD FOR TEN SECONDS (LONGER IF WEATHER IS COLD).
 5. TURN ENGINE SWITCH CLOCKWISE TO START POSITION. RELEASE WHEN ENGINE STARTS.
 6. TURN POWER SWITCH FROM "OFF" TO "GEN" POSITION.
 7. TURN GENERATOR CIRCUIT BREAKERS TO "ON" POSITION. TURN ON OTHER CIRCUIT BREAKERS THAT ARE NEEDED.
- STOP PROCEDURE**
1. TURN ECU AND ALL ELECTRICAL DEVICES "OFF".
 2. TURN ALL CIRCUIT BREAKERS TO "OFF" POSITION.
 3. TURN POWER SELECT SWITCH TO "OFF" POSITION.
 4. TURN ENGINE SWITCH TO "OFF" POSITION.

ECU START AND STOP PROCEDURES

1. TURN ECU CIRCUIT BREAKERS TO "ON".
2. GO TO ACCESS PANEL ON FORWARD SIDE OF ECU FOR OPERATING INSTRUCTIONS.

LABEL 5

FOR MAXIMUM OPERATING PERFORMANCE OF THE GENERATOR SET AND TO AVOID WET STACKING, USE A MINIMUM LOAD OF 10kW AT ALL TIMES. (SEE WATTMETER ON INSTRUMENT PANEL.)

TO MAINTAIN A MINIMUM OF 10kW, USE THE HVAC UNITS ALOAD. IF CLIMATE CONTROL IS NOT NEEDED IN THE SHELTER, REMOVE THE AIR DUCTS FROM THE SHELTER AND CONTINUE OPERATING THE HVAC UNIT.

Figure 11. Location of Identification and Data Plates on Genset Control Panel Access Door.

Table 11. Identification and Data Plates on Genset Control Panel Access Door.

LABEL	DESCRIPTION
1	Instruction plate – Black with white text. Informs user of Operating Procedures for Fuel Fired Coolant Heater.
2	Instruction plate – Black with white text. Informs user of scheduled PMCS.
3	Instruction plate – Black with white text. Informs user of required setting of BATTERY SWITCH for Genset operation.
4	Instruction plate – Black with white text. Informs user of start and stop procedures for Genset and ECU.
5	Instruction plate – Black with white text. Informs user of load requirements on Genset to prevent wet stacking.

END OF WORK PACKAGE

OPERATOR INSTRUCTIONS
HP-2C/185 UST Trailer
ON-VEHICLE EQUIPMENT LOADING PLAN

SCOPE

The following illustrations and tables assist in identifying all on-vehicle equipment when the HP-2C/185 UST Trailer system is ready to deploy.

NOTE

Some items listed in this Load Plan are not included with the basic trailer. These items are shown for illustrative purposes to advise where they would be best located if they are added to the trailer.

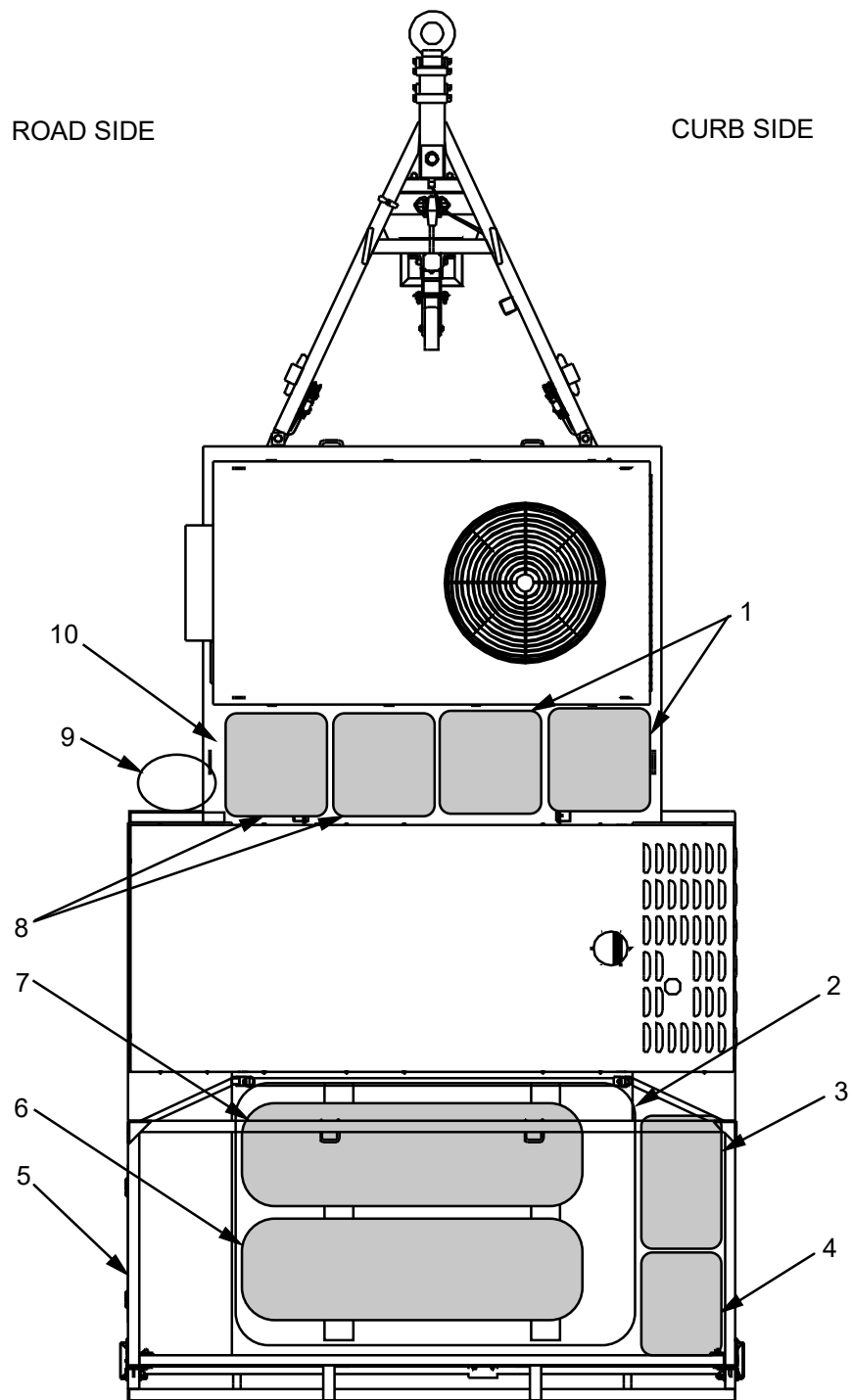


Figure 1. HP-2C/185 UST Trailer Loading Plan.

Table 1. HP-2C/185 UST Trailer Loading Plan.

ITEM NO.	ITEM NAME	QUANTITY
1	ECU Ducts (1-supply, 1-return) (in cargo bags)	2
2	Shelter (in cargo bag)	1
3	Electrical Wiring kit (in cargo bag)	1
4	Stake set (in cargo bag)	1
5	<u>Storage compartment which holds:</u>	
	Shelter repair kit	1
	Funnel	1
	Auxiliary fuel lines	1
	Technical Manual	1
	250 hour push pack	1
6	End cap (in cargo bag)	1
7	End cap (in cargo bag)	1
8	Shelter light set (in cargo bag)	2
9	Dry chemical fire extinguisher	1
10	Ground Rod Assembly (not shown)	1

END OF WORK PACKAGE

CHAPTER 3

CREW TROUBLESHOOTING PROCEDURES

FOR

HP-2C/185 UST Trailer

CREW TROUBLESHOOTING PROCEDURES HP-2C/185 UST Trailer CREW TROUBLESHOOTING INDEX

GENERAL

This WP contains a troubleshooting index of conditions/indications that may develop during maintenance or operation. Maintenance is limited to those failures that may be repaired at the crew level. The troubleshooting index identifies the condition/indication, which is followed by a column that identifies the work package and page(s) where crew level troubleshooting procedure(s) may be found (in the form of an inspection), followed by simple corrective actions which may be done by the crew. These inspections and corrective actions should be performed in the order listed. The index is provided to assist in the quick location of a problem. The manual cannot list all conditions/indications that may occur. If a condition/indication is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

TROUBLESHOOTING INDEX

The troubleshooting index assists the operator after a fault occurs. When a fault occurs, carefully inspect the equipment for fault indications to determine the best condition/indication to follow. The most important step in troubleshooting is recognizing the conditions/indications and combination of conditions/indications. Use the corrective action for a given condition/indication in the order of appearance. If the first repair attempt is unsuccessful, proceed to the next recommended corrective action to resolve the problem. If a fault is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

Except for the equipment in the Crew Troubleshooting Index (Table 1), refer to appropriate technical manual(s) for any remoted equipment. (Table 1) is provided as a tool to maintain equipment in good operating condition and ready for its primary mission.

Table 1. Crew Troubleshooting Index.

ITEM	CONDITION/INDICATION	WP
	GENSET (Engine)	
1	Coolant leaking	0011-2
2	Fuel leaking	0011-2
3	Oil leaking	0011-2
4	Battery acid leaking	0011-3
5	Engine does not crank	0011-3
6	Engine turns over slowly	0011-3
7	Engine cranks but does not start	0011-3
8	Engine cranks but does not start (ambient temperature below 32°F (0°C))...	0011-3
9	Engine stops (no warning lights)	0011-4
10	Engine stops (HIGH COOLANT TEMP warning light on).....	0011-4
11	Engine stops (LOW OIL PRESSURE warning light on)	0011-4
12	Engine stops (OVERSPEED warning light on).....	0011-5
13	Excessive carbon deposits appear on exhaust outlet	0011-5
14	Engine emits excessive smoke	0011-5
15	DC VOLT meter reads below 28 VDC while Genset is running	0011-5
16	Engine temperature remains below 120°F (48.88°C).....	0011-5
17	AC KILOWATTS meter reads 0 with Genset under load	0011-5
18	Engine temperature above 220°F (104.4°C), engine still running	0011-5
19	Engine oil pressure reading below 20 psi, engine still running	0011-6
20	Engine heater (Hydronic) will not start (no fault code)	0011-6
21	Engine heater (Hydronic) (fault code F01 or F02)	0011-6

Table 1. Crew Troubleshooting Index – Continued.

ITEM	CONDITION/INDICATION	WP
	GENSET (Engine) - Continued	
22	Engine heater (Hydronic) (fault code F03).....	0011-6
23	Engine heater (Hydronic) (fault code F04, F05, F06, F07, F08, F09, F010).....	0011-6
	GENSET (Electrical)	
1	Generator produces no voltage	0012-2
2	Generator produces low voltage (under no load condition)	0012-2
3	Generator produces low voltage (under load condition)	0012-2
4	Generator produces high voltage (under no load condition).....	0012-2
5	Generator produces high voltage (under load condition).....	0012-2
6	Generator voltage fluctuates/wanders	0012-3
7	Generator frequency out of tolerance	0012-3
8	Generator builds voltage from start-up then goes to low voltage	0012-3
	ECU	
1	ECU will not run on Genset power	0013-2
2	ECU will not run on shore power	0013-2
3	Voltage out of phase (red light on ECU control panel light).....	0013-2
4	Conditioned air too cold (in Heat mode)	0013-2
5	Conditioned air too warm (in Cool mode)	0013-2
6	Evaporator or condenser fan does not operate	0013-3
7	Coolant leaking	0013-3
8	Fuel leaking.....	0013-3
9	Hydronic heater will not start (no fault code)	0013-3
10	Hydronic heater (fault code F01 or F02).....	0013-3
11	Hydronic heater (fault code F03, F04, F05, F06, F07, F08, F09, F010)	0013-3
	TRAILER	
1	Hand brake does not engage.....	0014-2
2	Trailer lights do not work	0014-2
3	Trailer does not track straight when towed	0014-2
4	Tire will not hold air pressure	0014-2
5	Tongue jack assembly will not raise/lower.....	0014-2
6	Stabilizer leg will not raise/lower	0014-3

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
GENSET (ENGINE) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required
Two

References
WP 0005, WP 0021

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the Genset by crew-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the Genset. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around Genset. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Table 1. Crew Troubleshooting – Genset (Engine).

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
1	Coolant leaking	<p>WARNING</p> <p>If Genset has been in operation, components (i.e., engine, radiator) may be extremely hot. To prevent serious injury to personnel, allow sufficient time for cool down before proceeding with checks.</p> <p>Inspect overflow bottle and hose for damage or leaking.</p> <p>Inspect radiator for damage or leaking.</p> <p>Inspect coolant hoses for proper connections, damage, or leaking.</p> <p>Check coolant drain valves are turned off and drain plug is secure.</p> <p>Contact Maintainer Maintenance.</p>
		<p>WARNING</p> <p>All fuels generate explosive fumes and gases. Utilize extreme caution. Do not smoke or use open flame when in the vicinity of fuels and associated tanks, lines. Death or severe burns to the operator or damage to the equipment may result.</p> <p>Inspect fuel tank for damage or leaking.</p> <p>Inspect fuel lines for damage or leaking.</p> <p>Inspect fuel pump for damage or leaking.</p> <p>Inspect fuel filter for damage or leaking.</p> <p>Check fuel drain valve is turned off and drain plug is secure.</p> <p>Contact Maintainer Maintenance.</p>
3	Oil leaking	<p>Inspect oil filter for damage or leaking.</p> <p>Inspect oil pan for damage or leaking.</p> <p>Inspect oil lines and drain valves.</p> <p>Contact Maintainer Maintenance.</p>

Table 1. Crew Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
4	Battery acid leaking	<p>WARNING</p> <p>Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.</p> <p>Battery acid can be dangerous, do not touch. Death or severe burns may result.</p> <p>Inspect battery for cracks or other breaks.</p> <p>Contact Maintainer Maintenance.</p>
5	Engine does not crank	<p>Check BATTERY SWITCH is set to ON.</p> <p>Check batteries for loose connections.</p> <p>Check for loose ground connection on engine.</p> <p>Check solenoid(s) and starter for loose connections.</p> <p>Check for low voltage. If below 24 VDC, attach generator NATO slave receptacle to vehicle and attempt to start engine (WP 0005).</p> <p>Contact Maintainer Maintenance.</p>
6	Engine turns over slowly	<p>Attach generator NATO slave receptacle to vehicle or trailer and attempt to start engine (WP 0005). If engine still starts slowly, contact Maintainer Maintenance.</p>
7	Engine cranks but does not start	<p>Check if EMERGENCY STOP button pushed in. Reset.</p> <p>Check for fuel supply valve set to proper operating mode (WP 0005). Reset.</p> <p>Check actuator and diesel speed sensor connections.</p> <p>Check for fuel.</p> <p>Check fuel level in fuel tank. Add fuel and restart engine (WP 0005).</p> <p>Contact Maintainer Maintenance.</p>
8	Engine cranks but does not start (ambient temperature below 32°F (0°C))	<p>Check if EMERGENCY STOP button pushed in. Reset.</p> <p>Check for fuel supply valve is set to proper operating mode (WP 0005). Reset.</p>

Table 1. Crew Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
8 (cont.)		<p>Set ENGINE switch to PREHEAT for approximately 30 seconds. Restart.</p> <p>Check fuel level in fuel tank. Add fuel and restart engine (WP 0005).</p> <p>Set ENGINE HEATER (hydronic) and FUEL LINE HEATER switches to on (UP) (WP 0005).</p> <p>Contact Maintainer Maintenance.</p>
9	Engine stops (no warning lights)	<p>Check if EMERGENCY STOP button pushed in. Reset.</p> <p>No fuel. Refill fuel tank, Set CB1 – CB5 OFF and remove load. Turn ENGINE switch to OFF then to START to restart engine (WP 0005).</p> <p>Contact Maintainer Maintenance.</p>
10	Engine stops (HIGH COOLANT TEMP warning light on)	<p>WARNING</p> <p>If coolant is not visible in radiator, let the engine cool down then restart engine and add coolant while the engine is running.</p> <p>Engine overheating due to lack of coolant. Refill radiator to 1" and overflow bottle to proper level of 1/3 to 1/2 full (WP 0021).</p> <p>Turn ENGINE switch to OFF then to START to restart engine and check warning light (WP 0005).</p> <p>Re-circulated exhaust gas or engine air. Reposition trailer for better circulation. Turn ENGINE switch to OFF then to START to restart engine and check warning light (WP 0005).</p> <p>Obstructed air inlets or exhausts. Clear air inlets and exhausts. Turn ENGINE switch to OFF then to START to restart engine and check warning light (WP 0005).</p> <p>Overloaded engine. Reduce load on engine. Turn ENGINE switch to OFF then to START to restart engine and check warning light (WP 0005).</p> <p>Contact Maintainer Maintenance.</p>
11	Engine stops (LOW OIL PRESSURE warning light on)	<p>Engine shutdown due to low oil pressure. Check and refill engine oil (WP 0021). Turn ENGINE switch to START to restart engine. Check warning light (WP 0005).</p> <p>Contact Maintainer Maintenance.</p>

Table 1. Crew Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
12	Engine stops (OVERSPEED warning light on)	Check for fuel. Refill fuel tank. Turn ENGINE switch to OFF then to START to restart engine (WP 0005). Contact Maintainer Maintenance.
13	Excessive carbon deposits appear on exhaust outlet	WARNING If Genset has been in operation, exhaust system (pipes, muffler, spark arrestor) may be extremely hot. To prevent serious injury to personnel, allow sufficient time for cool down before proceeding. Engine operating without sufficient load. Perform the following: <ul style="list-style-type: none"> • Add additional load to the engine by turning on the ECU and operating at minimum 50% load for 4 hours. Obstructed exhaust system. Perform the following: <ul style="list-style-type: none"> • Check that exhaust pipe outlet is not clogged or blocked. • Check that an exhaust pipe is not broken. • Check rain cap for proper function. Obstructed air inlet system. Perform the following: <ul style="list-style-type: none"> • Check that air filter inlet is not blocked. • Check that air filter is not clogged. Contaminated fuel. Contact Maintainer Maintenance. Contact Maintainer Maintenance.
14	Engine emits excessive smoke	Ensure FUEL SUPPLY switch is placed fully in proper position. Contact Maintainer Maintenance.
15	DC VOLT Meter reads below 28 VDC while Genset is running	Contact Maintainer Maintenance.
16	Engine temperature remains below 120°F (48.88°C)	Contact Maintainer Maintenance.
17	AC KILOWATTS meter reads 0 with Genset under load	Contact Maintainer Maintenance.
18	Engine temperature above 220°F on COOLANT TEMP gauge (104.4°C), engine still running	NOTE At high ambient temperatures the COOLANT TEMP gauge temp can read 230° F (110°C) normally.

Table 1. Crew Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
18 (cont.)	Engine temperature above 220°F on COOLANT TEMP gauge (104.4°C), engine still running	Shut down system (WP 0005). Contact Maintainer Maintenance.
19	Engine oil pressure below 20 psi, engine still running	<p>NOTE</p> <p>At high ambient temperatures the OIL PRESSURE gauge temp can read 15 psi normally.</p> <p>Shut down system (WP 0005). Contact Maintainer Maintenance.</p> <p>NOTE</p> <p>When ENGINE HEATER switch (on Genset control panel) flashes, there is a problem with the engine heater (hydronic). See Engine Heater (Hydronic) Fault Codes (Table 2) for fault codes.</p>
20	Engine heater (hydronic) will not start (no fault code)	<p>Check batteries are connected.</p> <p>Check battery switch is turned to on.</p> <p>Check battery voltage is above 20 VDC. If low, recharge batteries (WP 0023) or slave off vehicle.</p> <p>Contact Maintainer Maintenance.</p>
21	Engine heater (hydronic) (fault code F01 or F02)	<p>Turn ENGINE HEATER switch on Genset control panel off for 2 minutes.</p> <p>Check Genset fuel level, fuel Genset (WP 0005).</p> <p>Contact Maintainer Maintenance.</p>
22	Engine heater (hydronic) (fault code F03)	<p>Turn ENGINE HEATER switch on Genset control panel off for 2 minutes.</p> <p>Check battery voltage on DC VOLTS meter. If low, recharge batteries (WP 0023) or slave off vehicle. If voltage within 22 to 28 VDC, contact Maintainer Maintenance.</p> <p>Turn ENGINE HEATER switch on Genset control panel ON.</p> <p>Contact Maintainer Maintenance.</p>
23	Engine heater (hydronic) (fault code F04, F05, F06, F07, F08, F09, F010)	Contact Maintainer Maintenance.

NOTE

When ENGINE HEATER switch (on Genset control panel) flashes, there is a problem with the Engine heater (Hydronic). The number of flashes indicates a specific fault code (i.e., one flash is F01, two flashes is F02).

There is a sequence of slow and fast flashes. Count the slow flashes.

Table 2. Engine Heater (Hydronic) Fault Codes.

FAULT CODE	DESCRIPTION	POSSIBLE CAUSE
F01	No Start-up	<ul style="list-style-type: none"> • Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F02	Flame Extinguished	<ul style="list-style-type: none"> • Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F03	Under/Over voltage	<ul style="list-style-type: none"> • Vehicle Charging System
F04	Premature Flame Detection	<ul style="list-style-type: none"> • Heater faulty
F05	Circulating Pump Interruption or Short Circuit	<ul style="list-style-type: none"> • Open or Shorted Wiring • Defective Pump
F06	Temperature Sensor Interruption or Short Circuit	<ul style="list-style-type: none"> • Heater faulty
F07	Metering Pump (Fuel pump) Interruption or Short Circuit	<ul style="list-style-type: none"> • Open or Shorted Wiring
F08	Combustion Fan Motor Interruption, Short Circuit, or Incorrect fan Speed	<ul style="list-style-type: none"> • Heater faulty
F09	Pencil Type Glow Plug/Flame Detector Interruption or Short Circuit	<ul style="list-style-type: none"> • Heater faulty
F10	Overheating Condition	<ul style="list-style-type: none"> • Coolant Flow Restriction • Circulation Pump

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
GENSET (ELECTRICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required
Two

References
WP 0005

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the Genset by crew-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the Genset. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the Genset. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Table 1. Crew Troubleshooting – Genset (Electrical).

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
		<p>WARNING</p> <p>If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow sufficient time for cool down before proceeding with checks.</p>
1	Generator produces no voltage	<p>Check that VOLT/AMP selector switch is properly set.</p> <p>Check that CB5 on circuit breaker panel is not tripped. Reset if needed and recheck voltage.</p> <p>Contact Maintainer Maintenance.</p>
2	Generator produces low voltage (under no load condition)	<p>Check that voltage is within 5 VAC of norm (208 VAC) on A-C VOLT gauge.</p> <p>Adjust voltage using VOLTAGE ADJUST potentiometer on Genset Control Panel.</p> <p>If voltage is more than ± 5 VAC from norm, contact Maintainer Maintenance.</p>
3	Generator produces low voltage (under load condition)	<p>Check that voltage is within 5 VAC of norm (208 VAC) on A-C VOLT gauge.</p> <p>Adjust voltage using VOLTAGE ADJUST potentiometer on Genset Control Panel.</p> <p>If voltage is more than ± 5 VAC from norm, contact Maintainer Maintenance.</p>
4	Generator produces high voltage (under no load condition)	<p>Check that voltage is within ± 5 VAC of norm (208 VAC) on A-C VOLT gauge.</p> <p>Adjust voltage using VOLTAGE ADJUST potentiometer on Genset Control Panel.</p> <p>If voltage is more than ± 5 VAC from norm, contact Maintainer Maintenance.</p>
5	Generator produces high voltage (under load condition)	<p>Check that voltage is within ± 5 VAC of norm (208 VAC) on A-C VOLT gauge.</p> <p>Adjust voltage using VOLTAGE ADJUST potentiometer on Genset Control Panel.</p> <p>If voltage is more than ± 5 VAC from norm, contact Maintainer Maintenance.</p>

Table 1. Crew Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
6	Generator voltage fluctuates/wanders	Contact Maintainer Maintenance.
7	Generator frequency out of tolerance	Verify that sufficient fuel is present. Verify that there are no sudden or frequent load changes. Turn on equipment one at a time while monitoring HERTZ meter (WP 0004). If meter begins to drop, do not add any more draw to the system. Ensure that air filter is clean and is not clogged. Contact Maintainer Maintenance.
8	Generator builds voltage from start-up then goes to low voltage	Contact Maintainer Maintenance.

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
ECU TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required
Two

References
WP 0005

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the ECU by crew-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the HP-2C/185 UST Trailer. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Table 1. Crew Troubleshooting – ECU.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
1	ECU will not run on Genset power	<p>Ensure POWER ON light on ECU is lit indicating power available to ECU.</p> <p>Ensure power cable from Genset to ECU is properly connected and no apparent damage is present.</p> <p>Ensure Genset is running.</p> <p>Ensure CB1 and CB5 on Genset Circuit Breaker Panel are energized and have not tripped or need reset.</p> <p>Contact Maintainer Maintenance.</p>
2	ECU will not run on shore power	<p>NOTE</p> <p>If red light is lit, do not attempt to use shore power.</p> <p>Ensure POWER ON light on ECU is lit indicating power available to ECU.</p> <p>Disconnect shore power. Connect to Genset and operate ECU (WP 0005).</p>
3	Voltage out of phase (red light on ECU control panel light)	Contact Maintainer Maintenance.
4	Conditioned air too cold (in Heat mode)	<p>Ensure temperature dial on ECU control panel is set to proper temperature.</p> <p>Ensure MODE SELECT switch on ECU control panel is set to proper selection (WP 0005).</p> <p>Check for open or missing access panels on unit.</p> <p>If using hydronic heater, ensure AUXILIARY HEAT switch on ECU control panel is NOT flashing.</p> <p>Ensure ducts are attached properly and that no cuts, slits, or other damage is present allowing air to escape.</p> <p>Contact Maintainer Maintenance.</p>
5	Conditioned air too warm (in Cool mode)	<p>Ensure temperature dial on ECU control panel is set to proper temperature.</p> <p>Ensure MODE SELECT switch on ECU control panel is set to proper selection (WP 0005).</p> <p>Check for open or missing access panels on unit.</p>

Table 1. Crew Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
5 (cont.)	Conditioned air too warm (in Cool mode)	<p>Check that evaporator coils are not iced over. If necessary, shut down ECU (WP 0005) and allow any ice to melt.</p> <p>Check that condenser coils are not clogged or blocked.</p> <p>Ensure air filters are not clogged.</p> <p>Contact Maintainer Maintenance.</p>
6	Evaporator or condenser fan does not operate	<p>Ensure belt is properly tensioned and not loose, and that no damage is present.</p> <p>Contact Maintainer Maintenance.</p>
7	Coolant leaking	Contact Maintainer Maintenance.
8	Fuel leaking	Contact Maintainer Maintenance.
		<p>NOTE</p> <p>Fault code is determined by the number of times the AUXILIARY HEAT switch flashes (i.e. one flash is F01, two flashes is F02, etc.). See ECU Hydronic Heater Fault Codes (Table 2) for fault codes.</p>
9	Hydronic heater will not start (no fault code)	<p>Ensure POWER ON light on ECU is lit indicating power available to ECU.</p> <p>Ensure AUXILIARY HEAT switch is set to AUTO or MANUAL and that switch is illuminated.</p> <p>Contact Maintainer Maintenance.</p>
10	Hydronic heater (fault code F01 or F02)	<p>Set AUXILIARY HEAT switch (hydronic heater) on ECU Control Panel to OFF. Wait 2 minutes.</p> <p>Check Genset fuel level. If necessary, refuel (WP 0005).</p> <p>Attempt to re-start hydronic heater (turn AUXILIARY HEAT switch to MANUAL or AUTO).</p> <p>If unit fails to start after 3 attempts, contact Maintainer Maintenance.</p>
11	Hydronic heater (fault code F03, F04, F05, F06, F07, F08, F09, F010)	Contact Maintainer Maintenance.

NOTE

When AUXILIARY HEAT switch (on ECU control panel) flashes, there is a problem with the hydronic heater. The number of flashes indicates a specific fault code (i.e., one flash is F01, two flashes is F02).

There is a sequence of slow and fast flashes. Count the slow flashes.

Table 2. ECU Hydronic Heater Fault Codes.

FAULT CODE	DESCRIPTION	POSSIBLE CAUSE
F01	No Start-up	<ul style="list-style-type: none"> • Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F02	Flame Extinguished	<ul style="list-style-type: none"> • Fuel Supply • Restricted Air Flow Through Intake or Exhaust
F03	Under/Over voltage	<ul style="list-style-type: none"> • Vehicle Charging System
F04	Premature Flame Detection	<ul style="list-style-type: none"> • Heater faulty
F05	Circulating Pump Interruption or Short Circuit	<ul style="list-style-type: none"> • Open or Shorted Wiring • Defective Pump
F06	Temperature Sensor Interruption or Short Circuit	<ul style="list-style-type: none"> • Heater faulty
F07	Metering Pump (Fuel pump) Interruption or Short Circuit	<ul style="list-style-type: none"> • Open or Shorted Wiring
F08	Combustion Fan Motor Interruption, Short Circuit or Incorrect fan Speed	<ul style="list-style-type: none"> • Heater faulty
F09	Pencil Type Glow Plug/Flame Detector Interruption or Short Circuit	<ul style="list-style-type: none"> • Heater faulty
F10	Overheating Condition	<ul style="list-style-type: none"> • Coolant Flow Restriction • Circulation Pump

END OF WORK PACKAGE

CREW TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
TRAILER TROUBLESHOOTING PROCEDURES

INITIAL SETUP:

Personnel Required
Two

References
WP 0005

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the trailer by crew-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the trailer. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Table 1. Crew Troubleshooting – Trailer.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
1	Hand brake does not engage	<p>Inspect brake cable(s) for damage.</p> <p>Adjust hand brake.</p> <p>Contact Maintainer Maintenance.</p>
2	Trailer lights do not work	<p>Verify that vehicle lights are on.</p> <p>Inspect inter-vehicular cable for bent pins, corrosion, or other visible damage.</p> <p>Check and tighten connections. Test lights.</p> <p>Contact Maintainer Maintenance.</p>
3	Trailer does not track straight when towed	<p>Improper tire pressure. Ensure both tires are properly inflated for use (20 psi - highway; 17 psi - off road).</p> <p>Check hand brakes are not over tightened.</p> <p>Contact Maintainer Maintenance.</p>
4	Tire will not hold air pressure	<p>Inspect tire for visible damage (cuts, holes, slices, etc.) or excessive wear.</p> <p>Contact Maintainer Maintenance.</p>
5	Tongue jack assembly will not raise/lower	<p>Ensure no dirt, rocks, sand, or other debris are present.</p> <p>Ensure tongue jack assembly is not at full extension or retraction (WP 0005). If so, perform the following:</p> <ol style="list-style-type: none"> 1. Connect trailer to vehicle. 2. Move tongue jack assembly to center position. 3. Adjust skid plate/dolly wheel assembly so that it is within 2 to 3 inches of the ground. 4. Lift trailer off of vehicle using tongue jack assembly. <p>Inspect crank for damage or corrosion.</p> <p>Inspect leg for bowing, bending, kinking, or other physical deformities that may stop tongue jack assembly from raising/lowering.</p> <p>Contact Maintainer Maintenance.</p>

Table 1. Crew Troubleshooting – Trailer – Continued.

ITEM	CONDITION/INDICATION	CORRECTIVE ACTION
6	Stabilizer leg will not raise/lower	<p>Ensure stabilizer leg is not at full extension. If so, perform the following:</p> <ol style="list-style-type: none">1. Raise stabilizer leg to fully raised position.2. Adjust jack foot so that it is within 2 to 3 inches of the ground.3. Lift trailer off of vehicle using tongue jack assembly. <p>Ensure no dirt, rocks, sand, or debris is present.</p> <p>Inspect for corrosion.</p> <p>Inspect leg for bowing, bending, kinking, or other physical deformities that may stop leg from raising/lowering.</p> <p>Contact Maintainer Maintenance.</p>

END OF WORK PACKAGE

CHAPTER 4

CREW MAINTENANCE INSTRUCTIONS

FOR

HP-2C/185 UST Trailer

CREW MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
SERVICE UPON RECEIPT

INITIAL SETUP:

Personnel Required
Two

References
WP 0005, WP 0017

GENERAL

The following procedures are required to be performed by the crew in order to prepare the shelter and its contents for use.

SITING

To ensure minimal problems with set-up of HP-2C/185 UST Trailer and good operation of equipment being used inside the HP-2C/185 UST Trailer, ensure area is:

- Dry.
- Level with adequate room for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (trees, buildings, or other structures) that would impede set-up of the HP-2C/185 UST Trailer or cause physical interference for trailer, shelter, system grounding, and all other associated equipment.
- Free of items (e.g., towers, power lines, radar, trees, buildings) that would cause interference with electronic equipment being used inside of shelter.

SITE REQUIREMENTS

The HP-2C/185 UST Trailer requires a foot print of 16 feet (4.85 meter) by 7 feet (2.16 meter) for set-up and installation.

SERVICE UPON RECEIPT OF MATERIEL

Inspect each system component for damage incurred during shipment. If any damage is visible, notify supervisor. Report the damage on DD Form 361, Transportation Discrepancy Report. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with applicable service instructions.

Once all covers are removed, inspect the trailer, shelter, and each piece of equipment. Inspect all connectors, cables, and loose pieces of equipment located in the trailer cargo box. Refer to Crew PMCS (WP 0017) before placing the equipment into service.

INSTALLATION INSTRUCTIONS

The HP-2C/185 UST Trailer shelter and trailer requires some assembly depending upon the mode of operation. To setup the trailer in a fixed position, refer to Operation Under Usual Conditions (WP 0005) for setup and installation procedures.

PRELIMINARY SERVICING OF EQUIPMENT

Perform all Crew PMCS for the HP-2C/185 UST Trailer as listed in Crew PMCS (WP 0017).

PRELIMINARY CHECKS AND ADJUSTMENT OF EQUIPMENT

There are no preliminary checks and adjustment of this equipment. Before placing the HP-2C/185 UST Trailer into service, ensure all Crew PMCS (WP 0017) has been performed.

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
PMCS INTRODUCTION

GENERAL

This work package provides data necessary to keep the HP-2C/185 UST Trailer system operational ready. PMCS are performed to keep the HP-2C/185 UST Trailer system in operational condition. The checks are used to find, correct, and report problems. Maintenance personnel are required to perform the tasks as indicated in Crew PMCS (WP 0022, Table 1). PMCS are performed by the crew each time the equipment is operated. Prior to performing any maintenance that requires climbing on or under the trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from the trailer suddenly rolling or tipping.

Before you begin operating the HP-2C/185 UST Trailer system and/or its equipment, perform Before PMCS.

Once a week perform Weekly PMCS. If the HP-2C/185 UST Trailer system has not been operated in a week, perform Before PMCS.

Perform Monthly PMCS once a month. If the HP-2C/185 UST Trailer system has not been operated in a month, perform After PMCS at the same time.

If you are operating the HP-2C/185 UST Trailer system for the first time, perform Weekly and Monthly PMCS the first time you do your Before PMCS.

If you find something wrong when performing PMCS, fix it if you can. Otherwise, notify Maintainer Maintenance.

WARNINGS AND CAUTIONS

Special attention should be paid to the WARNINGS and CAUTIONS appearing in the crew PMCS table. A WARNING means someone could be injured. A CAUTION means equipment could be damaged.

LEAKAGE DEFINITION

It is necessary for you to know how fluid leakage affects the status of the trailer. The following are definitions of the classes of leakage you need to know to be able to determine the status of the trailer. Learn these leakage definitions. When in doubt, contact Maintainer Maintenance.

CAUTION

Crews must report Class III leaks to Maintainer Level Maintenance. Failure to comply may result in damage to equipment.

NOTE

The following note applies to non-flammable liquids only. Any leakage of flammable liquid is unacceptable.

Equipment operation is allowable with minor leakages (Class I or II). Consideration must be given to fluid capacity of the item or system being checked. When Crew is in doubt, notify next level maintenance.

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.

LEAKAGE DEFINITION – Continued

CLASS I – Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II – Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

CLASS III – Leakage of fluid great enough to form drops that fall from the item being checked.

INSPECTION

Look for signs of a problem or trouble. Senses help here. You can feel, smell, hear, or see many problems. Be alert when inspecting the HP-2C/185 UST Trailer system.

Inspect to see if items are in good condition. Are they correctly assembled, stowed, and secured, or excessively worn, leaking, corroded, or improperly lubricated? Correct any problems found or notify the next level of maintenance.

There are some common items to check all over the HP-2C/185 UST Trailer system. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, Crews must notify Maintainer Level Maintenance.
2. Welds: Many items on the trailer are welded. To check these welds, look for chipped paint, rust corrosion, or gaps. When these conditions exist, Crews must notify Maintainer Level Maintenance.
3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any are found, Crews must notify Maintainer Level Maintenance.
4. Hoses and fluid lines: Look for wear, damage, and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. When you find a leak, Crews must notify Maintainer Level Maintenance.
5. Fan belts: Look for wear and damage, make sure belts are not cracked, frayed, or excessively worn. When these conditions exist, Crew must notify Maintainer Level Maintenance.

LUBRICATION SERVICE INTERVALS - NORMAL CONDITIONS**General**

For safer, more trouble-free operations, make sure that your HP-2C/185 UST Trailer system is serviced when it needs it. Proper lubrication and service intervals, which are the responsibility of the Crew level maintenance, are found in this WP.

Adherence

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the services prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied. Change the hard time interval if lubricants are contaminated or if operating the equipment under adverse operating conditions, including longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals must be applied during the warranty period.

WARNING

Cleaning solvents may be toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using cleaning solvent. Failure to comply may result in serious injury or death to personnel.

If personnel become dizzy while using cleaning solvents, immediately get fresh air and medical help. If cleaning solvent contacts skin or clothes, flush with cold water. If cleaning solvent contacts eyes, immediately flush eyes with water and get medical attention. Failure to comply may result in serious injury or death to personnel.

Cleaning Fittings Before Lubrication

Clean parts with cleaning solvent. Dry before lubricating.

Lubrication After Fording

If a fording operation occurs, lubricate all fittings below fording depth and check submerged gear boxes for presence of water.

Lubrication After High Pressure Washing

After a thorough washing, lubricate all grease fittings and oil can points outside and underneath trailer.

Corrosion Control

Refer to General Information (WP 0001), Corrosion Prevention and Control (CPC), for appropriate corrosion control procedures.

Hard Time Lubrication Intervals

For equipment under manufacturer's warranty, hard time lubrication intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g. longer than usual operating hours, extended idling periods, extreme dust).

EXPLANATION OF TABLE ENTRIES

Item Number - Numbers in this column are for reference. When completing DA Form 2404/DA Form 5988E (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers appear in the order in which the checks/services are performed for the interval listed.

Interval – This column indicates when a procedure must be performed (e.g., Before, During, After, Monthly).

Item to Be Checked or Serviced – This column indicates the item that is to be checked or serviced.

Procedure – This column describes the procedure that must be followed to ensure the equipment is capable of performing its intended mission.

Equipment Not Ready/Available If – This column lists conditions that make the HP-2C/185 UST Trailer not fully mission-capable. If possible, fix the problem using the troubleshooting procedures and/or maintenance procedures in the manual. If this is not possible, write up the items not fixed on DA Form 2404/DA Form 5988E for Crew maintenance. For further information on how to use this form, see DA PAM 750-8.

EXPLANATION OF TABLE ENTRIES - Continued

Other Entries – Be sure to observe and annotate all special circumstances that appear/occur.

NOTE

If the equipment must be kept in continuous operation, only perform those procedures that will not disturb operation. Complete checks and services when the equipment is shut down.

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
PMCS

INITIAL SETUP:**Tools and Special Tools**

Field repair kit

Personnel Required

Two

Materials/Parts

Oil (WP 0152, Items 35 and 36)

Coolant (WP 0152, Item 2)

Brake Fluid (WP 0152, Item 6)

References

WP 0021, WP 0025, WP 0026

WP 0034

Table 1. Crew Preventive Maintenance Checks and Services.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1	Before	ENVIRONMENTAL CONTROL UNIT (ECU) ECU Enclosure	1. Inspect access panels for damage. Check that all latches and hinges are operational. 2. Inspect filters. Check that filters are clean and free of excessive dirt, grease, and grime. 3. Inspect supply and return ducts. Check that no damage or corrosion is present. Check that screens are free of debris. 4. Inspect fan blades and protective cage. Check that no damage or corrosion is present. 5. Inspect evaporator fan bearings. Check that no damage or corrosion is present. 6. Inspect condenser and evaporator coils. Check that no damage, leaks, or corrosion present. 7. Inspect interior base for water build-up. 8. Check for missing, damaged, corroded, or loose hardware.	Cannot secure access panels. Filters excessively dirty. Supply ducts ripped, torn, or otherwise damaged beyond repair. Screens are obstructed. Fan blades/cage bent, impeding operation. Bearings damaged, noisy, or corroded. Coils damaged, leaking.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1 (cont.)	Before	ECU Enclosure	<p>9. Inspect condenser grill. Check that grill is not clogged or damaged and is clean and free of excessive dirt, grease, and grime.</p> <p>10. Inspect interior for fluid. If fluid is present, inspect further for loose connections or damaged hoses.</p>	<p>Condenser grill is excessively dirty, clogged, or damaged.</p> <p>Class III coolant or lubrication leak present.</p> <p>Any fuel leak present.</p> <p>Damaged hoses or loose connections present.</p>
2	Before	End Panel, Evaporator Assembly	<p>1. Inspect sliding door. Check that knob is operational and is not damaged, corroded, or loose.</p> <p>2. Inspect damper plate and damper rod. Check that items are operational and not damaged, corroded, or loose.</p> <p>3. Inspect duct covers. Check that no rips, tears, or other damage is present.</p> <p>4. Check for missing, damaged, corroded, or loose hardware.</p>	
3	Before	Control Enclosure, ECU	<p>1. Inspect panel. Check that all latches and hinges are operational.</p> <p>2. Check all components (i.e., switches, knobs, meter, lens, thermostat) for damage.</p> <p>3. Check for missing, damaged, corroded, or loose hardware.</p>	<p>Cannot secure access panels.</p> <p>Components missing or damaged.</p>
4	Before	Blower Assembly	<p>1. Check all components (i.e., blower, evaporator motor) for damage.</p> <p>2. Inspect belt. Check for proper tension, damage, or excessive wear.</p> <p>3. Check for missing, damaged, corroded, or loose hardware.</p>	<p>Components missing or damaged.</p> <p>Broken or loose belt.</p>
5	Before	Heater (Hydronic)	<p>1. Check coolant levels in reservoir. Add coolant if necessary (WP 0021).</p>	<p>Cannot replenish coolant.</p>

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
6	Before	GENSET Generator, Diesel Engine	<ol style="list-style-type: none"> 1. Inspect access panels for damage. Check that all latches and hinges are operational. 2. Check that air intake and exhaust louvers are free and clear of debris. 3. Inspect electronic components (i.e., switches, circuit breakers, meters, lights) on control panel(s) for damage. Check that all components are operational (no loose items, burnt out bulbs, etc.). 4. Inspect ground stud/cable. Check that no damage or corrosion is present. 5. Inspect fuel control panel. Check lines, fuel cap, and selector switch for damaged, corroded, or missing parts. 6. Inspect fuel lines for leaks at external and internal connections. 7. Check fuel gauge. Verify that sufficient fuel is present for operation. 8. Check that frequency on HERTZ gauge is between 58 Hz to 62 Hz. 9. Check for missing, damaged, corroded, or loose hardware. 	<p>Cannot secure access panels.</p> <p>Components missing or damaged and renders the unit not mission capable.</p> <p>Ground stud/cable damaged, corroded, or frayed.</p> <p>Components missing or damaged.</p> <p>Any fuel leaks.</p> <p>HERTZ meter not within specified range.</p>
7	Before	Battery Assembly	<ol style="list-style-type: none"> 1. Inspect battery. Check that no damage or other obvious deterioration is present to battery. 2. Inspect battery cables. Check that connections are secure, no fraying, corrosion, or other visible damage is present. 3. Check for missing, damaged, corroded, or loose hardware. 	<p>Cracked/damaged battery.</p> <p>Cables fraying, improper connections, or battery corrosion is present.</p>

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
8	Before	Engine Assembly	<p>1. Inspect engine for missing, loose, or damaged parts. Check for wear or deterioration.</p> <p>2. Inspect all cables and hoses for leaks, cracks, swelling, or other obvious deterioration. Check that all clamps are properly secured.</p> <p>3. Check fluid levels. Verify that fluids (i.e., oils, coolants) are at their proper levels, no discoloration or indication of burning/overheating is present. If necessary, add oil or coolant. See (WP 0021) for proper instructions and specifications.</p> <p>4. Check for fuel, oil, and coolant leaks.</p> <p>5. Check hydronic heater for leaks.</p> <p>6. Check for missing, damaged, corroded, or loose hardware.</p>	<p>Any condition that renders the unit not mission capable.</p> <p>Engine leaks present. Damaged hoses, cables, or other parts.</p> <p>Low fluid, discolored fluids.</p> <p>Any fuel leaks present. Any Class III oil or coolant leaks present.</p> <p>Any fuel leaks present. Any Class III oil or coolant leaks present.</p>
9	Before	Cooling System, Engine	<p>1. Inspect fan blades/pulley for obvious damage.</p> <p>2. Inspect all belts for proper tension, damage, or excessive wear.</p> <p>3. Inspect water pump for cracks, leaks, or other damage.</p> <p>4. Check for missing, damaged, corroded, or loose hardware.</p>	<p>Fan blades or pulley bent or damaged.</p> <p>Broken or loose belts.</p> <p>Water pump inoperative, damaged, or leaking.</p>
10	Before	Air Intake Assembly	<p>1. Inspect air filter.</p> <p>2. Check for missing, damaged, corroded, or loose hardware.</p>	<p>Air filter clogged or missing.</p> <p>Hardware missing.</p>
11	Before	Radiator Assembly	<p>1. Inspect radiator for dents, holes, or leaks.</p> <p>2. Inspect hoses for cracks, swelling, or other obvious deterioration.</p>	<p>Radiator assembly damaged/leaking.</p> <p>Hoses cracked, swollen, damaged, or leaking.</p>

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
11 (cont.)	Before	Radiator Assembly	<p>3. Inspect overflow bottle for cracks, leaks, or other obvious deterioration.</p> <p>4. Inspect hose clamps. Verify that clamps are secure and that no damage or other obvious deterioration is present.</p> <p>WARNING</p> <p>Ensure radiator is fully cooled. Hot coolant could erupt into crew's face and cause severe injury.</p> <p>5. Check coolant level. Verify that fluid in overflow bottle is 1/3 to 1/2 full and no discoloration or indication of burning/overheating is present. If necessary, add coolant to reservoir. See (WP 0021) for proper instructions and specifications.</p> <p>6. Check for missing, damaged, corroded, or loose hardware.</p>	<p>Class III leaks.</p> <p>Clamps loose or damaged.</p>
12	Before	Exhaust Assembly	<p>1. Inspect muffler and exhaust pipes for dents, holes, or leaks.</p> <p>2. Inspect clamps. Check that clamps are secure and that no damage or other obvious deterioration is present.</p> <p>3. Check for missing, damaged, corroded, or loose hardware.</p>	<p>Muffler/exhaust pipes damaged/leaking.</p> <p>Clamps loose or damaged.</p>
13	Before	TRAILER Chassis, Trailer Assembly	<p>1. Inspect all exterior surfaces. Ensure that they are free and clear of loose debris.</p> <p>2. Inspect parking brakes. Ensure that both parking breaks are engaged.</p> <p>3. Inspect wheel chocks. Ensure that they are present and in proper location.</p>	<p>Parking brakes will not engage.</p>

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
13 (cont.)	Before	Chassis, Trailer Assembly	14. Check for missing, damaged, corroded, or loose hardware.	
14	Before	Stop Light, Vehicular	1. Inspect for missing or damaged lens lights or loose hardware. 2. Inspect electrical cables for damage or fraying.	Cables damaged, frayed, or inoperative.
15	Before	Tongue Jack Assembly	1. Inspect condition of skid plate/dolly wheel assembly for proper mounting to landing post or tongue jack. 2. Inspect crank handle for proper operation. Check that no corrosion is present on mechanism. 3. Check for missing, damaged, corroded, or loose hardware.	Skid plate/dolly wheel tongue jack missing, inoperative, or shows signs of structural damage. Crank handle damaged, missing, or inoperative.
16	Before	SHELTER	Inspect and verify that assembly is complete, and no components are missing.	Assembly is not complete, and components are missing.
17	Before	Shelter, Shelter	1. Inspect shelter covers (interior and exterior) for punctures, tears, separated seams, or other visible damage. Repair, if necessary, using field repair kit (WP 0025). 2. Inspect doors (interior and exterior) for punctures, tears, separated seams, or other visible damage. Repair if necessary using field repair kit (WP 0025). 3. Inspect shelter for breaks, cracks, or other visible damage. Repair if necessary using field repair kit (WP 0025). 4. Inspect all visible hubs and hub extensions for breaks, cracks, or displacement. 5. Inspect cinch belts for cuts, fraying, or other visible damage.	Shelter will not stay erected.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
18	Before	Shelter, Roof, and Sides	<ol style="list-style-type: none"> 1. Inspect covers (interior and exterior) for punctures, tears, separated seams, or other visible damage. Repair if necessary using field repair kit (WP 0025). 2. Inspect all visible air beams for breaks, cracks, or other visible damage. Repair if necessary (WP 0034). 	Shelter will not stay erected.
19	Before	POWER DISTRIBUTION UNIT (PDU)	<ol style="list-style-type: none"> 1. Inspect overall unit for damage. 2. Inspect all circuit breakers. Verify that all are operational and no damage is present. 3. Inspect all outlets. Verify that no visible damage is present. 	
19 (cont.)	Before	PDU	<ol style="list-style-type: none"> 4. Check that connectors are secure, no fraying, corrosion, or other visible damage is present. 5. Check for missing, damaged, corroded, or loose hardware. 	
20	Before	LIGHT SET, SHELTER	<ol style="list-style-type: none"> 1. Inspect overall unit for damage. 2. Inspect lamps. Verify that no visible damage is present. 3. Inspect electrical connection. Ensure that connection is secure, no corrosion or other visible damage is present. 4. Check for missing, damaged, corroded, or loose hardware. 	

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
21	Before	Wiring Kit, Electrical	<p>1. Inspect electrical cables. Ensure that no fraying or other visible damage is present.</p> <p>2. Inspect electrical connectors. Ensure that connection is secure, no corrosion or other visible damage is present.</p> <p>3. Check for missing, damaged, corroded, or loose hardware.</p>	
		ECU	NOTE	
			The following items are located on the ECU control panel located behind the access door.	
22	During	Power indicator light (POWER ON)	Verify that POWER ON light is illuminated.	No power to ECU.
		Phase indicator light (OUT OF PHASE)	Verify that OUT OF PHASE light is NOT illuminated.	OUT OF PHASE light illuminated.
	During	Hour meter (HOURS 1/10)	Verify that hour meter is operational.	
22 (cont.)		Auxiliary heat switch (AUX HEAT)	Verify that AUXILIARY HEAT switch light is NOT flashing.	
		GENSET		
23	During	AC Ammeter (A-C AMPERES)	Verify that AC ammeter does NOT exceed 60 amps.	
		Frequency meter (HERTZ)	Verify that frequency meter reads 60 Hz $\pm 2\%$ (1.2 Hz).	Frequency cannot be adjusted within tolerance.
		Wattmeter (A-C KILOWATTS)	Verify that wattmeter does NOT exceed 18 kW.	
		AC Voltmeter (A-C VOLTS)	Verify that AC voltmeter reads 208 VAC.	AC voltage cannot be adjusted to 208 VAC.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
23 (cont.)	During	DC Voltmeter (D-C VOLTS)	Verify that DC voltmeter reads between 26 VDC – 31 VDC. Green area on meter is 24 VDC to 31 VDC.	
		Temperature Gauge (COOLANT TEMP)	Verify that temperature gauge reads between 170°F – 200°F (76.66°C-93.33°C).	Temperature gauge exceeds 200°F (93.33°C).
		Hour meter (HOURMETER)	Verify that hour meter is operational.	Hour meter is non-operational.
		Oil Pressure Gauge (OIL PRESSURE)	Verify that oil pressure gauge reads 20 to 55 psi.	Oil pressure gauge falls below 20 psi.
		Battery Charger Ammeter (BATTERY CHARGER AMPS)	Verify that battery charger ammeter reads: Normal – 0 amps. If battery is being charged via the 120 VAC battery charger, ammeter should read: 0 to 5 amps.	Non-operational.
		Ammeter – Voltmeter selector switch (VOLT/AMP)	Rotate switch (L1-L2, L2-L3, L3-L1). Each time review readings on AC voltmeter (A-C VOLTS) and AC ammeter (A-C AMPERES). If necessary adjust VOLTAGE ADJUST potentiometer.	
		High Coolant Temperature indicator light (HIGH COOLANT TEMP)	Push light to test for operational status.	HIGH COOLANT TEMP light is on and remains illuminated. Indicates that temperature is over 200°F. Engine must be shut down.
		Over Speed indicator light (OVERSPEED)	Push light to test for operational status.	OVERSPEED indicator light is on and remains illuminated. Engine must be shut down.
		Low oil-pressure indicator light (LOW OIL PRESSURE)	Push light to test for operational status.	LOW OIL PRESSURE indicator is on and remains illuminated. Engine must be shut down.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
24	During	Voltage adjust potentiometer (VOLTAGE ADJUST)	Rotate potentiometer clockwise/counter-clockwise. AC voltmeter (A-C VOLTS) should fluctuate with adjustment.	A-C VOLTS meter fluctuates. Change phases on VOLT/AMP switch and verify that potentiometer is bad.
		Indicator lamps	<p>NOTE</p> <p>The following items are located on the Genset Power Distribution Panel located on the curbside of the Genset.</p> <p>The following applies to the indicator lights for connectors J1 through J5 (AC voltage) of Genset power distribution panel. J6 (+28 VDC) does not have a indicator light.</p>	
		Indicator lamps	<p>Push light to test for operational status on old version PDP only.</p> <p>Swivel black out cover to check operational status. On new version PDP only.</p>	<p>Indicator light does not illuminate during test.</p> <p>Contact Maintainer Maintenance if lamp not illuminated.</p>
		<p>SHELTER</p> <p>Outer Skin (includes End Sections and Vestibule)</p>	<p>NOTE</p> <p>Common outer skin and end section tear points are at the corners, mudflaps, becket laces and grommets.</p> <p>Inspect exterior, interior and floor material, fabric loops, ties, hook and pile fastening strips for holes, cuts, frays, tears, burns, improper installation, loose, or broken stitching.</p> <p>Inspect vestibule frames, hitch clip pins, attaching lanyards, plastic d-rings and shelter slips for missing or damage parts that would prevent proper operation.</p>	<p>Presence of holes, cuts, frays, tears, burns, improper installation, loose, or broken stitching beyond the available patch material in the repair kit.</p> <p>Missing or damaged vestibule frames, hitch clip pins, attaching lanyards, plastic d-rings or shelter slips that would prevent proper operation.</p>

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
25	During	Windows and Clear Window Panels	NOTE Floor becket loops are located under the hook and pile fastening straps.	3 or more broken Becket lacing loops.
			Check becket lacing loops for frayed, cut, loose, or broken Becket lacing loops.	
			NOTE Common window panel tear points are at the corners.	
26	During	External Bracing, Snow Straps and Shelter Support Ropes	Inspect for holes, cuts, frays, tears, burns, improper installation, loose, or broken stitching.	Presence of holes, cuts, frays, tears, burns, improper installation, loose, or broken stitching beyond the available patch material in the repair kit.
			Inspect for cuts, frays, tears, burns, improper installation, loose, or broken hardware.	
			Inspect for bent, cracked, damaged, loose, or missing shelter pins that would prevent proper operation or installation.	
27	During	Liner Assembly including Liner End Section and Plenum	Inspect liner and plenum material, fabric loops, ties, hook and pile fastening strips for holes, cuts, frays, tears, burns, improper installation, loose, or broken stitching.	Presence of bends, cracks, damage, loose, or missing shelter pins that would prevent proper operation or installation.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
28	During	PDU Voltmeter select switch	Inspect plastic d-rings and clips for missing or damage parts that would prevent proper operation. Rotate switch. Each time review readings on voltmeter on PDU.	Missing or damaged plastic d-rings or clips that would prevent proper operation.
29	After	GENSET Fuel tank	If the Genset will be non-operational for more than 120 days, run Genset until ½ - inch of fuel is left in tank and drain tank.	Old fuel, sludge, and/or water in fuel tank.
30	After	Trailer/ECU/ Genset	Perform visual inspection of trailer, Genset, ECU for fuel, oil, coolant, and other leaks.	Class III leaks found.
31	After	SHELTER	Inspect, clean and verify that assembly is complete, and no components are missing IAW WP 00XX.	Assembly is not complete, and components are missing.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
32	Monthly	Inflation System	<p>Check inflation system air pressure by performing the following steps:</p> <ol style="list-style-type: none"> 1. At the shelter exterior, on the manifold side of the shelter, open the AirBeam ball valve access pockets and open all four AirBeam pigtail ball valves to connect all AirBeams to the inflation system. 2. Open the manifold air hose access pocket and remove pressure gauge. 3. Connect the pressure gauge QD fitting to the deflation air hose QD fitting. 4. Open the deflation air hose ball valve. 5. Visually verify that the shelter inflation system reads 50 +/- 5 PSIG at the air pressure gauge. 6. Restore equipment to normal operating condition. 	AirBeam air pressure reading is outside acceptable range of 50 +/- 5 PSIG. Refer to WP 0005 to inflate shelter to 50 +/- 5 PSIG.
	Monthly	Air Compressor	Inspect for presence and proper operation IAW owner's manual	Missing or inoperable IAW owner's manual.
	Monthly	AirBeam Purge Vacuum	Inspect for presence and proper operation IAW owner's manual.	Missing or inoperable IAW owner's manual.
	Monthly	Stake Removal Tool	Inspect for presence and or damage.	Missing or has damage that would prevent proper operation.

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
FLUIDS

GENERAL

This work package provides information needed by the Crew when performing the following maintenance procedures on the HP-2C/185 UST Trailer.

- Add oil to engine – Service
- Add coolant to engine radiator – Service
- Add brake fluid to master cylinder – Service

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing any service or maintenance.

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Carbon monoxide does not have color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when other vehicle is operated near the HP-2C/185 UST Trailer.

Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.

Battery acid can be dangerous. Do not touch. Death or severe burns may result.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

ADD OIL TO ENGINE - SERVICE**INITIAL SETUP:****Materials/Parts**

Funnel (WP 0180, Table 2, Item 2)
Oil (WP 0180, Item 24-25)
Cloth, cleaning (WP 0180, Item 12)

Personnel Required

One (1)

References

WP 0005, WP 0180

Equipment Condition

Genset Shut Down
Control Power switch set to OFF
BATTERY SWITCH set to OFF

SERVICE**WARNING**

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

NOTE

To ensure proper engine oil level, check daily, especially before and after operation. Engine oil should be between the two marks on the dipstick. Engine oil should not smell burnt and should be of the proper color and consistency.

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Stop Procedure).
2. Remove and retain rear Genset access panel (Figure 1, Item 1).
3. Check oil level with the dipstick (Figure 1, Item 2). If oil level is low, proceed to next step. If oil level is correct insert dipstick (Figure 1, Item 2) and go to step 10.
4. Remove and retain oil filler cap (Figure 1, Item 3).

NOTE

Make sure that oil being added is the proper weight and viscosity for your environment (see Table 1). Use funnel supplied with trailer to avoid spillage.

5. Add oil to engine at filler cap (Figure 1, Item 3) and re-check the oil level.
6. Insert dipstick and install oil filler cap (Figure 1, Item 3).
7. Start Genset in accordance with Genset Start Procedure (WP 0005) and allow engine to run for a few minutes to circulate oil through engine.
8. Shut down Genset in accordance with Genset Stop Procedure (WP 0005) and allow a few minutes for the oil to settle.

SERVICE – Continued

9. Check oil level with the dipstick (Figure 1, Item 2). If oil level is still low, repeat steps 4 through 7. If dipstick (Figure 1, Item 2) indicates proper oil level, re-insert the dipstick (Figure 1, Item 2) and verify that oil filler cap (Figure 1, Item 3) is secure.
10. Wipe off any oil that has spilled. Install and latch rear access panel (Figure 1, Item 1).
11. Start Genset in accordance with Genset Start Procedure (WP 0005).

NOTE

Refer to Expendable and Durable Items (WP 0180) for NSN and other information on oil listed in table below.

Table 1. Engine Oil Recommendations.

Ambient Temperature	Mono-grade	Multi-Grade
Below 5°F (–15°C)	5W	5W/20
Between 5°F (–15°C) and 50°F (10°C)	10W	10W/30
Between 40°F (5°C) and 85°F (30°C)	20W	10W/30 or 15W/40
Above 85°F (30°C)	30W	15W/40 or 20W/40

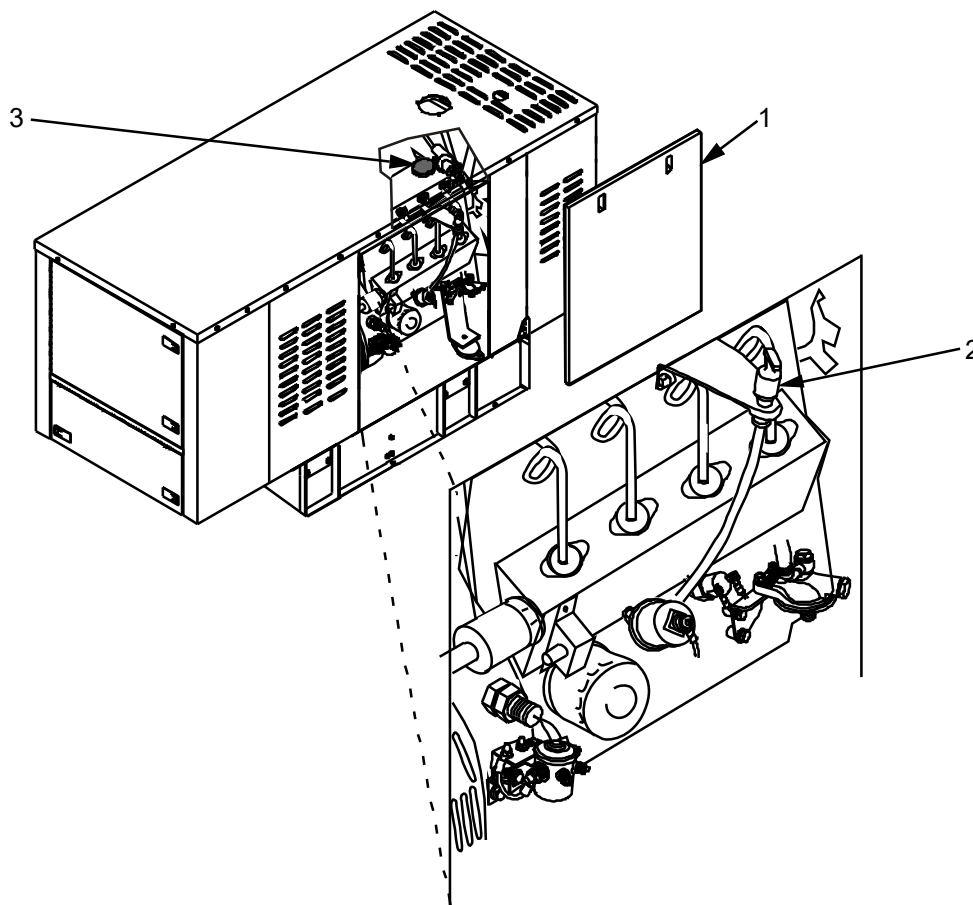


Figure 1. Oil Fill Tube and Dip Stick on Engine Location.

END OF TASK

ADD COOLANT TO ENGINE RADIATOR - SERVICE

INITIAL SETUP:**Tools and Special Tools**

Funnel

References

WP 0005

Materials/PartsAntifreeze (WP 0180, Item 2)
wheels

Cloth, cleaning (WP 0180, Item 14)

Rubber gloves (WP 0180, Item 24)

Safety glasses

Equipment Condition

Trailer parked, brakes engaged and

chocked

Genset Control Panel –

ENGINE switch set to OFF

Genset Control Panel - BATTERY

SWITCH set to OFF

Personnel RequiredOne

SERVICE**WARNING**

If Genset has been in operation, the radiator and its contents may be extremely hot and coolant may spew out of radiator when cap is removed. To prevent serious injury to personnel, allow the Genset to cool down before performing the following step.

NOTE

Level of coolant in coolant bottle should be checked daily especially before and after operation. Coolant bottle should be 1/3 to 1/2 full. Coolant should also be inspected for proper color and consistency.

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Stop Procedure).
2. Remove and retain Genset access panel (Figure 2, Item 4).

NOTE

When performing the following step, if the coolant does not have the proper color or consistency then the coolant should be drained and replaced. Contact Service maintenance.

3. Check fluid level in radiator overflow bottle (Figure 2, Item 3). Fluid level in overflow bottle should be 1/3 to 1/2 full when the engine is cool.
4. If necessary, remove cap and add coolant to achieve the proper level (1/3 to 1/2 full) in radiator overflow bottle (Figure 2, Item 3).
5. Remove and retain access cap (Figure 2, Item 2) located on the top of the Genset enclosure.
6. Remove and retain radiator cap (Figure 2, Item 1) and observe coolant level. Coolant should be one inch below the overflow level.

SERVICE – Continued**NOTE**

When performing the following step, use funnel provided with the trailer.

7. If required, add coolant through the access cap (Figure 2, Item 2) until proper level is obtained.
8. Install and tighten radiator cap (Figure 2, Item 1) and access cap (Figure 2, Item 2).
9. Start Genset in accordance with Genset Start Procedure (WP 0005) and allow engine to run for a few minutes to circulate coolant through engine.
10. Shut down the Genset in accordance with Genset Stop Procedure (WP 0005) and allow radiator to cool. Check coolant level in radiator overflow bottle (Figure 2, Item 3). Radiator overflow bottle (Figure 2, Item 3) should be 1/3 to 1/2 full when the engine is cool. If necessary, repeat steps 3 through 7.
11. Install and latch rear access panel (Figure 2, Item 4).
12. Start Genset in accordance with Genset Start Procedure (WP 0005).

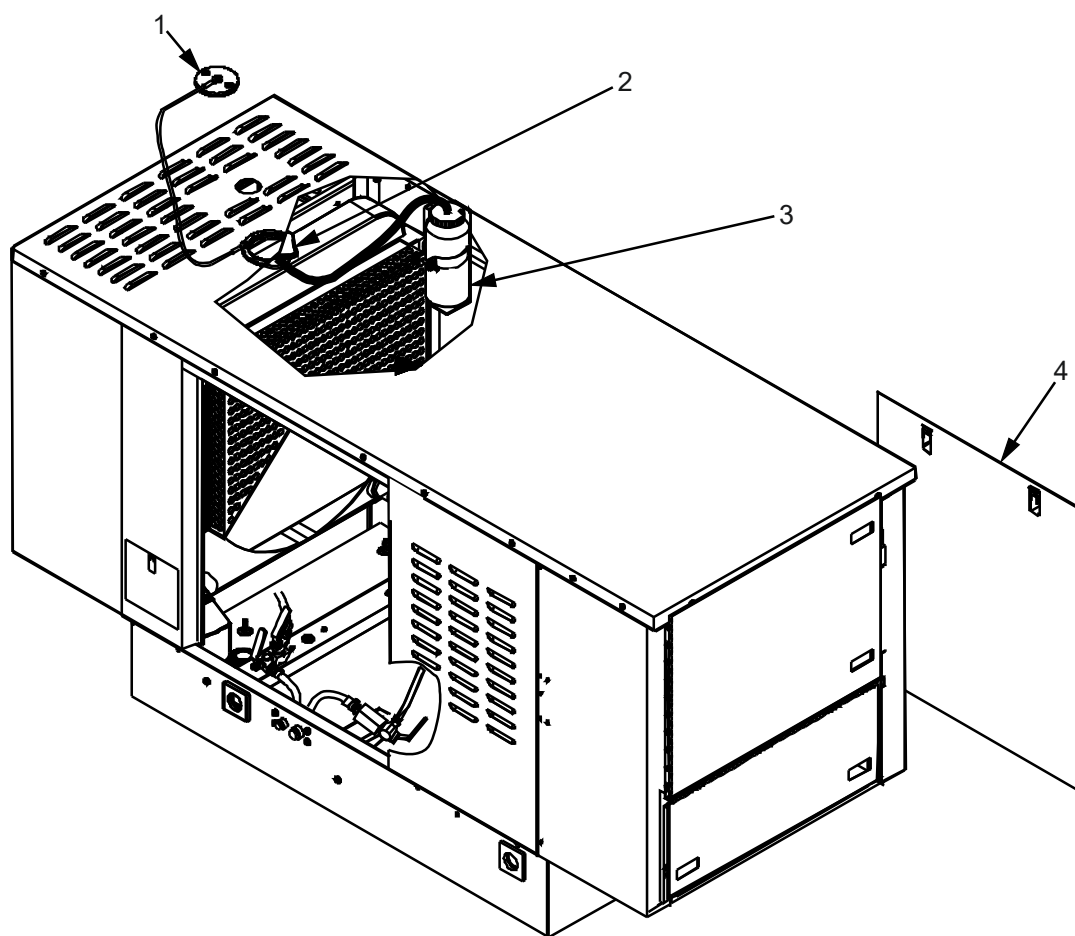


Figure 2. Location of Radiator and Radiator Overflow Bottle.

END OF TASK

MASTER BRAKE CYLINDER SERVICE

INITIAL SETUP:**Materials/Parts**

DOT 3 brake fluid (WP 0180, Item 6)
Cloth, cleaning (WP 0180, Item 14)
Rubber gloves (WP 0180, Item 24)
Safety glasses

Equipment Condition

Trailer parked in operational position
Trailer handbrakes engaged
Wheels chocked

Personnel Required

One

CAUTION

When performing the following service, DO NOT mix brake fluid types.

SERVICE**NOTE**

When master cylinder reservoir cap is removed use caution to keep debris from getting onto cap and into reservoir.

1. Remove and retain master cylinder reservoir cap (Figure 3, Item 1).

NOTE

When performing the following service, if fluid is contaminated, discolored, viscosity is incorrect, or if master cylinder reservoir is completely dry, contact next level of maintenance.

2. Inspect fluid level in master cylinder reservoir (Figure 3, Item 2). Fluid level should be approximately 3/4" from the neck of the master cylinder reservoir (Figure 3, Item 2).
3. If necessary, add brake fluid to master cylinder reservoir (Figure 3, Item 2).

NOTE

If cap does not turn smoothly remove and check threads. Forcing cap can result in damage to cap or master cylinder.

4. Replace master cylinder reservoir cap (Figure 3, Item 1) (cap should turn 1/4 turn clockwise to tighten).

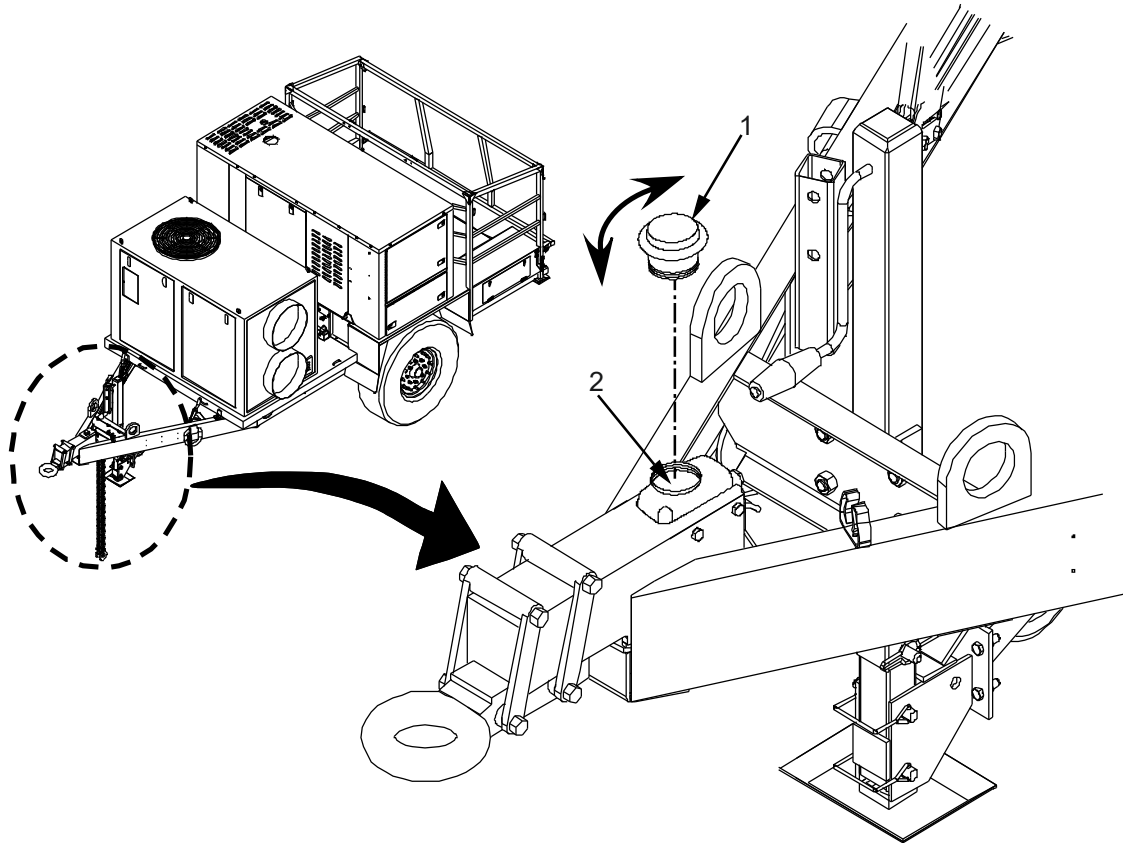


Figure 3. Master Brake Cylinder Service.

END OF TASK

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CONTROL PANEL

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Control panel indicator POWER ON lens removal/replacement.
-
- Control panel indicator OUT OF PHASE lens removal/replacement.
-
- Check/refill ECU heater (hydronic) coolant reservoir.

If necessary, refer to Description and Use of Operator Controls, Indicators, and Connectors (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

CONTROL PANEL INDICATOR LENS

INITIAL SETUP:**Materials/Parts**

Lens, indicator, green
Lens, indicator, red

References

WP 0005

Equipment Condition

ECU shut down

Personnel Required

One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Open ECU Control Enclosure (Figure 1, Item 1).
3. Turn indicator lens (Figure 1, Items 2 and 3) counter clockwise and remove.

END OF TASK**REPLACEMENT**

1. Align indicator lens (Figure 1, Items 2 and 3) with socket.
2. Insert, apply moderate pressure, and turn clockwise until secure.
3. Close ECU Control Enclosure (Figure 1, Item 1).
4. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005).

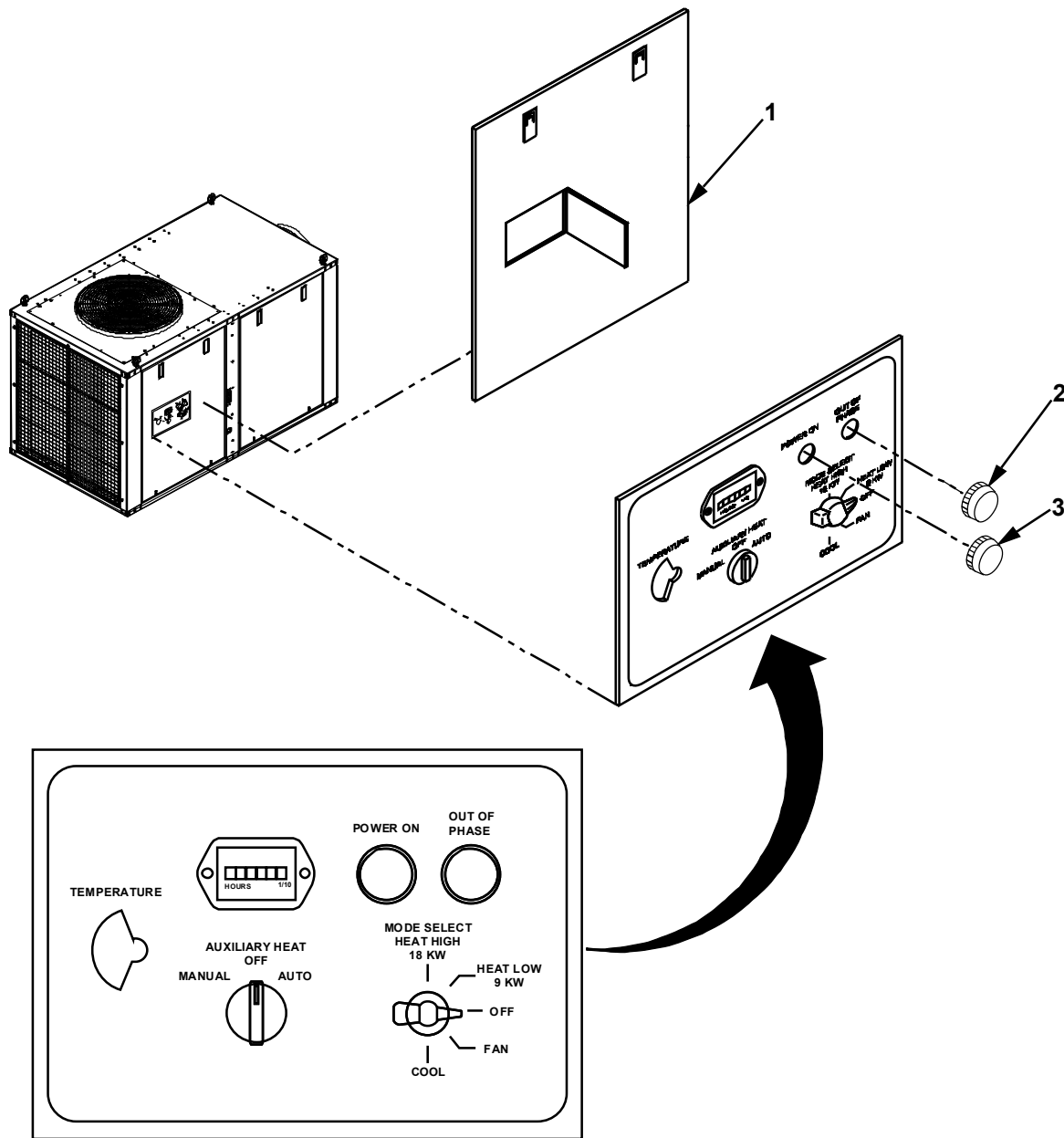


Figure 1. ECU Control Panel Lens Indicator Removal/Replacement.

END OF TASK

ECU HEATER (HYDRONIC) COOLANT RESERVOIR

INITIAL SETUP:**Materials/Parts**

Coolant (WP 0180, Item X)

References

WP 0005

Personnel Required

One

Equipment ConditionECU shut down

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

CHECK/REFILL COOLANT

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove forward access panel from ECU.
3. Turn radiator cap (Figure 2, Item 1) of ECU heater (hydronic) reservoir (Figure 2, Item 2) counterclockwise to open.
4. Check and fill reservoir (Figure 2, Item 2) as needed.

CAUTION

Do not overfill reservoir. Space must be allowed for the expansion of the heated coolant or overheating will result.

END OF TASK**REPLACEMENT**

1. Install radiator cap (Figure 2, Item 1) to reservoir (Figure 2, Item 2) and turn clockwise to tighten.
2. Attach forward access panel to ECU.
3. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005).

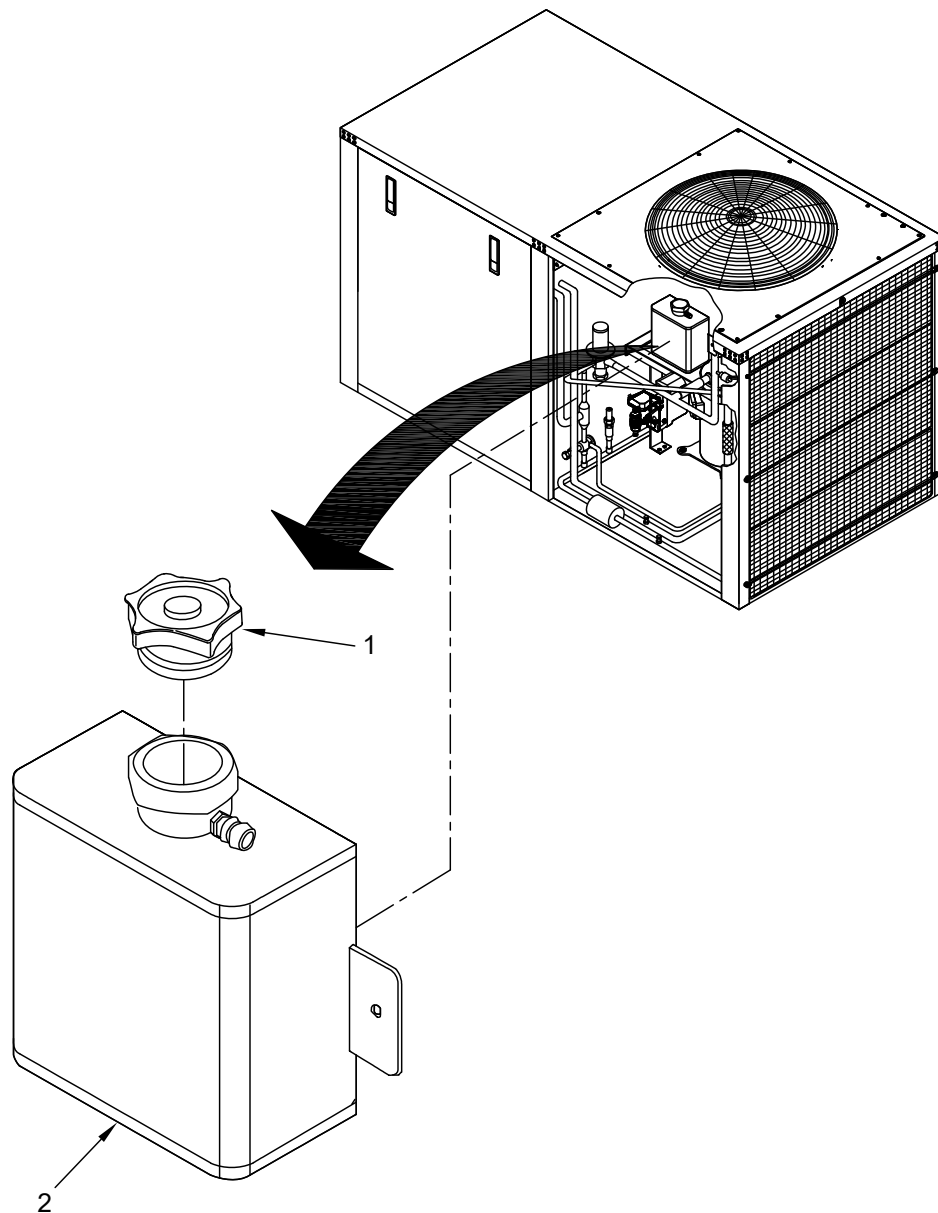


Figure 2. ECU Heater (Hydronic) Coolant Reservoir.

END OF TASK

END OF WORK PACKAGE

CREW MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER ELECTRICAL

GENERAL

This work package provides information needed by the Crew when performing the following maintenance procedures on the HP-2C/185 UST Trailer trailer and shelter.

- Charge batteries - Service
- Trailer lights/Inter-vehicular cable - Test

WARNING

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing any service or maintenance.

CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Carbon monoxide does not have color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when the ECU, Genset, or any other vehicle is operated near the shelter.

Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.

Battery acid can be dangerous. Do not touch. Death or severe burns may result.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CHARGE BATTERIES – SERVICE

INITIAL SETUP:**Materials/Parts**

NATO Cable

Personnel Required

One

References

WP 0005

Equipment Condition

Trailer parked, brakes engaged and
wheels chocked
ENGINE switch set to OFF
BATTERY SWITCH set to OFF

SERVICE**WARNING**

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never allowing the tool to bridge two terminals. Failure to observe this warning can result in serious injury.

NOTE

Prior to performing the following steps, inspect the batteries and cables for any visible damage. Verify that fluid level(s) are correct. If necessary, contact Unit maintenance to check fusible link between batteries.

Battery Charging (using alternator on Genset engine)

1. Start Genset in accordance with Genset Start Procedure (WP 0005) and allow alternator to charge battery.
2. Observe DC VOLTS meter (Figure 1, Item 1) and BATTERY CHARGER AMPS meter (Figure 1, Item 2) on Genset control panel (Figure 1, Item 3). See (Table 1) for normal meter indications.
3. If battery does not charge, contact Service maintenance.

END OF TASK**Battery Charging (using 24 VDC)****NOTE**

The batteries should be charged once every 6 months.

1. Connect appropriate NATO cable to 24 VOLTS DC (J6) (Figure 1, Item 5) of Genset Power Distribution Panel (Figure 1, Item 7) and to 28 VDC power source.
2. Verify that DC source is properly energized.
3. Check the indicator lamp and charge the batteries for eight hours.
4. Set ENGINE switch (Figure 1, Item 4) on the Generator Power Distribution Panel to the RUN position.

Battery Charging (using 24 VDC) - Continued

5. Observe DC VOLTS meter (Figure 1, Item 1) on Genset control panel (Figure 1, Item 3). See (Table 1) for normal meter indications. If battery does not charge (DC VOLTS meter should read between 24 to 28 VDC) after eight hours, continue charging for an additional four hours.
6. If battery does not charge after a total of 12 hours, contact Service maintenance.

END OF TASK**Battery Charging (using single phase 120 VAC)****NOTE**

The batteries should be charged once every 6 months.

1. Connect battery charger cable (provided with the trailer) to 120 VOLT INPUT (J5) (Figure 1, Item 6) on the Genset Power Distribution Panel and to 120 VAC power source.
2. Verify that AC source is properly energized.
3. Check the indicator lamp and charge the batteries for eight hours.
4. Set ENGINE switch (Figure 1, Item 4) on the Generator Power Distribution Panel to the RUN position.
5. Observe DC VOLTS meter (Figure 1, Item 1) on Genset control panel (Figure 1, Item 3). See (Table 1) for normal meter indications. If DC VOLTS meter does not read between 24 to 28 VDC after eight hours, continue charging for an additional four hours.
6. If battery does not charge after a total of 12 hours, contact Service maintenance.

END OF TASK

Table 1. Normal Meter Reading for Battery.

Meter	Normal Indication	Notes
DC VOLTS	Indicator in green area meter	Green area on meter is 24 VDC to 31 VDC
BATTERY CHARGER AMPS	0 amps	If battery is being charged via the 120 VAC battery charger, the ammeter should read: 0 to 5 amps

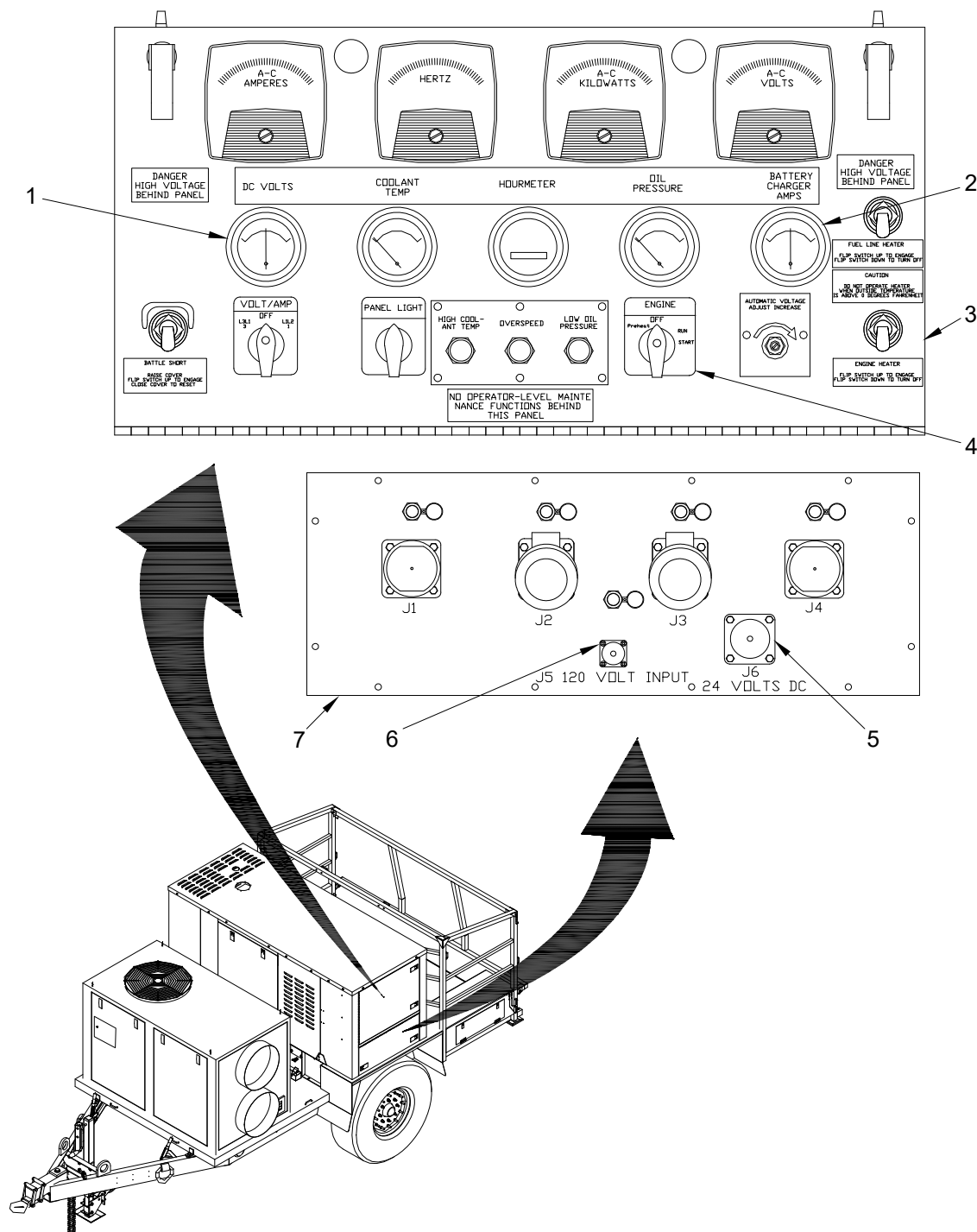


Figure 1. Location of Connectors and Meters for 24 VDC Battery Charging.

TRAILER LIGHTS/INTER-VEHICULAR CABLE - TEST

INITIAL SETUP:

Personnel Required

Two

Equipment Condition

Trailer connected to tow vehicle via inter-vehicular cable

TEST

1. Connect inter-vehicular cable assembly to tow vehicle.
2. While driver pushes down on brake pedal, observe that trailer brake lights activate.
3. While driver activates turn signals and hazard lights, observe that turn signal and hazard light on trailer activate.
4. While driver activates black-out drive lights, observe that trailer blackout lights activate.
5. If any of the above steps fail, contact Service maintenance.

END OF TASK

END OF WORK PACKAGE

CHAPTER 5

MAINTAINER TROUBLESHOOTING PROCEDURES

FOR

HP-2C/185 UST Trailer

MAINTAINER TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
MAINTAINER TROUBLESHOOTING INDEX

GENERAL

This WP contains a troubleshooting index of conditions/indications that may develop during maintenance or operation. Maintenance is limited to those failures that may be repaired at the Maintainer level. The troubleshooting index identifies the condition/indication, which is followed by a column that identifies the work package and page(s) where Maintainer level troubleshooting procedure(s) may be found (in the form of an inspection), followed by simple corrective actions which may be done by the Maintainer level. These inspections and corrective actions should be performed in the order listed. The index is provided to assist in the quick location of a problem. The manual cannot list all conditions/indications that may occur. If a condition/indication is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

TROUBLESHOOTING INDEX

The troubleshooting index assists the operator after a fault occurs. When a fault occurs, carefully inspect the equipment for fault indications to determine the best condition/indication to follow. The most important step in troubleshooting is recognizing the conditions/indications and combination of conditions/indications. Use the corrective action for a given condition/indication in the order of appearance. If the first repair attempt is unsuccessful, proceed to the next recommended corrective action to resolve the problem. If a fault is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

Table 1. Maintainer Troubleshooting Index.

ITEM	CONDITION/INDICATION	WP
GENSET (Electrical)		
1	Generator produces no voltage	0043-2
2	Generator produces no voltage (for one phase leg).....	0043-2
3	Generator produces no voltage (all phases bad)	0043-2
4	Generator produces low voltage (under no load condition).....	0043-4
5	Generator produces high voltage (under no load condition)	0043-6
6	Generator produces high voltage (under load condition)	0043-6
7	Generator produces low/high voltage (under load condition).....	0043-6
8	Generator voltage fluctuates/wanders.....	0043-8
9	Generator frequency out of tolerance.....	0043-9
10	Generator builds voltage from start-up then goes to low voltage	0043-10
11	No reading present on AC meter (A-C AMPERE, HERTZ, A-C KILOWATTS A-C-VOLTS) (M1 – M4)	0043-10
12	No reading present on DC VOLTS meter (M5)	0043-11
13	HOURLY METER (M7) not operating	0043-11
14	No reading present on BATTERY CHARGER AMPS meter (M9)	0043-11
15	No reading present on COOLANT TEMP gauge (M6)	0043-12
16	No reading present on OIL: PRESSURE gauge (M8).....	0043-12
17	BATTLE SHORT switch (SW5) suspect bad.....	0043-12
18	PANEL LIGHT switch (SW2) suspect bad	0043-13
19	VOLT/AMP switch (SW1) suspect bad.....	0043-13
20	ENGINE switch (SW3) suspect bad	0043-14
21	ENGINE HEATER switch (SW6) suspect bad	0043-15
22	FUEL LINE HEATER switch (SW8) suspect bad	

Table 1. Maintainer Troubleshooting Index – Continued.

ITEM	CONDITION/INDICATION	WP
GENSET (Electrical) – Continued		
23	HIGH COOLANT TEMP(L3), OVERSPEED(L4) , or LOW OIL PRESSURE (L5) suspect bad	0043-16
24	Control panel light(s) (L1 – L2) suspect bad	0043-16
25	VOLTAGE ADJUST potentiometer (R1) suspect bad	0043-16
26	BATTERY SWITCH (SW9) suspect bad.....	0043-17
27	EMERGENCY STOP (SW7) suspect bad	0043-17
28	Circuit Breaker (CB1 – CB5) suspect bad	0043-18
29	Power distribution panel light(s) (L6 – L10) suspect bad	0043-18
30	Relay (K4, K5, or K6) suspect bad.....	0043-19
31	Relay (K7) suspect bad.....	0043-19
32	Time delay (TDM) suspect bad	0043-20
33	Watt transducer (XDR) suspect bad	0043-20
34	Current transformer (CT) suspect bad	0043-21
35	Voltage regulator (VR) suspect bad	0043-21
36	Speed sensor (SS) suspect bad	0043-22
37	Governor controller (GC) suspect bad	0043-23
38	Battery charger (BC) suspect bad.....	0043-24
39	Voltage regulator or generator suspect bad.....	0043-24
GENSET (Engine)		
1	Coolant leaking	0044-2
2	Fuel leaking	0044-3
3	Oil leaking.....	0044-4
4	Battery acid leaking.....	0044-5
5	Engine does not crank	0044-5
6	Engine turns over slowly	0044-8
7	Engine cranks but does not start	0044-9
8	Engine stops (no warning lights).....	0044-16
9	Engine stops (HIGH COOLANT TEMP light on).....	0044-18
10	Engine stops (LOW OIL PRESSURE light on)	0044-21
11	Engine stops (OVERSPEED light on).....	0044-22
12	Engine emits white smoke from exhaust	0044-23
13	Engine emits blue smoke from exhaust.....	0044-23
14	Engine emits heavy black smoke from exhaust.....	0044-24
15	Excessive carbon deposits on exhaust outlet.....	0044-24
16	Engine temperature remains below 120°F (48.88°C).....	0044-24
17	AC KILOWATTS meter reads 0 with Genset under load	0044-25
18	DC VOLT meter reads below 28 VDC while Genset is running.....	0044-25
19	Engine temperature above 220°F (104.4°C), engine still running	0044-27
20	Engine oil pressure below 20 psi, engine still running	0044-27
21	Engine heater (hydronic) will not start (no fault code)	0044-28
22	Engine heater (hydronic) (fault code F01 or F02)	0044-29
23	Engine heater (hydronic) (fault code F03)	0044-30
24	Engine heater (hydronic) (fault code F04, F05, F06, F08, F09)	0044-30
25	Engine heater (hydronic) (fault code F07)	0044-30
26	Engine heater (hydronic) (fault code F010)	0044-30

Table 1. Maintainer Troubleshooting Index – Continued.

ITEM	CONDITION/INDICATION	WP
ECU (Electrical)/Hydronic Heater		
1	ECU will not run on GENSET power.....	0045-2
2	ECU will not run on shore power.....	0045-3
3	ECU won't run in any mode.....	0045-3
4	ECU won't run in cool mode.....	0045-5
5	ECU won't run in HEAT mode. (V1).....	0045-5
6	ECU won't run in HEAT HIGH (or HEAT LOW) mode (V2)	0045-6
7	Evaporator fan does not operate	0045-8
8	Condenser fan does not operate.....	0045-9
9	Compressor won't run	0045-10
10	Pressure switch fault	0045-12
11	Hydronic heater will not start (no fault code).....	0045-13
12	Hydronic heater (fault code F01 or F02)	0045-15
13	Hydronic heater (fault code F03).....	0045-15
14	Hydronic heater (fault code F07).....	0045-15
15	Hydronic heater (fault code F04, F05, F06, F08, F09, F010)	0045-17
16	Coolant leaking from hydronic heater/hoses.....	0045-17
17	Fuel leaking from hydronic heater.....	0045-17
ECU (Electrical Tests)		
1	Mode select switch - Test.....	0045-22
2	Thermostat - Test.....	0045-23
3	Circuit breakers - Test.....	0045-24
4	Compressor contactor - Test.....	0045-25
5	Heater contactor - Test.....	0045-26
6	Transformer- Test.....	0045-27
7	Bridge rectifier - Test	0045-27
8	CMSP/EMSP - Test.....	0045-28
ECU (Heating & Cooling)/Hydronic Heater		
1	Conditioned air too warm (in Cool mode).....	0046-2
2	Conditioned air too cold (in Heat mode).....	0046-4
3	Blower does not operate	0046-5
4	Discharge pressure too high	0046-5
5	Discharge pressure too low.....	0046-5
6	Suction pressure too high.....	0046-5
7	Suction pressure too low	0046-5
8	Compressor fails to start	0046-5
9	Compressor "short cycles"	0046-5
10	Compressor noisy	0046-5
11	Compressor starts normally but shuts down due to overload	0046-6
12	Compressor excessively noisy	0046-6
13	Conditioned air too cold (in Heat mode).....	0046-6

Table 1. Maintainer Troubleshooting Index – Continued.

ITEM	CONDITION/INDICATION	WP
TRAILER (Electrical)		
1	Tail light intermittent.....	0047-2
2	Tail light does not work.....	0047-3
TRAILER (Mechanical)		
1	Hand brake does not engage.....	0048-2
2	Hand brake does not disengage.....	0048-2
3	Brake fluid present under trailer.....	0048-2
4	Brake actuator does not engage.....	0048-2
5	Hydraulic brakes exhibit failure.....	0048-2
6	Trailer does not track straight when towed or leans to side.....	0048-3
7	Tire(s) will not hold air pressure.....	0048-3
8	Tongue jack assembly will not raise/lower.....	0048-3
9	Trailer stabilizer leg does not raise/lower.....	0048-3
10	Excessive motion of lunette.....	0048-3
SHELTER (Electrical)		
1	Shelter lighting does not come on.....	0049-2
2	No power from PDU.....	0049-2
3	Power indicator lights inoperable.....	0049-2

END OF WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
GENSET – (ELECTRICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit
(WP 0177, Item 1)
Multimeter (WP 0177, Item 2)

References

WP 0005, WP 0013, WP 0029,
WP 0040, WP 0041, WP 0044,
WP 0068 through WP 0086

Personnel Required

Two

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the Genset by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the Genset. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Maintainer Troubleshooting – Genset (Electrical).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Generator produces no voltage	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel (WP 0040) and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Wiring	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
2	Generator produces no voltage (for one phase leg)	VOLT/AMP switch or volt meter	Set BATTERY SWITCH to ON. Set CB5 to OFF. Set ENGINE switch to OFF. Open up generator junction box and attach DMM across the bad phase (L1, L2, or L3) to neutral (L0), on the source side. Start engine. If DMM voltage is not 120 VAC +/- 10% then replace generator (WP 0086). If within tolerance, use DMM to measure 120 VAC +/- 10% across source side (terminal 1, 5, or 7) of VOLT/AMP switch (SW1) and L0 (neutral terminal block). If within tolerance, isolate failure to either SW1 or volt meter M4. Replace faulty component. If not within tolerance, fuse or path to generator is open.
3	Generator produces no voltage (all phases bad)	Voltage regulator	Set BATTERY SWITCH to ON. Set CB5 to OFF.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)	Generator produces no voltage (all phases bad)	Voltage regulator	<p>Set ENGINE switch to OFF.</p> <p>Remove two voltage regulator mounting screws to access the underside. Verify the regulator fuse is not blown. Replace fuse if defective (WP 0079).</p> <p>Locate the F+ and F- field terminals and power input terminals (L3 at terminal 3 and L1 at terminal 4) on regulator. Verify continuity of the field terminal wires and power input wires to generator.</p> <p>Disconnect wires from voltage adjust terminals (6 and 7) of regulator.</p> <p>Verify VOLTAGE ADJUST potentiometer on Control Panel sweeps 1000 +/- 10% ohms across the wires. Replace potentiometer if bad (WP 0070).</p> <p>Reconnect the wires to terminals 6 and 7.</p> <p>Proceed to residual field loss malfunction.</p>
<p style="text-align: center;">NOTE</p> <p>Residual magnetism in the field coils of the generator may have become too weak to initiate electrical generation. The weak magnetic flux cannot overcome wire resistance to start self-generating current flow. Loss of the residual can be due to long periods of disuse, vibration during shipping, or extreme high temperature condition.</p> <p>The exciter field coils can be re-magnetized by applying DC voltage potential across them. This method of restoring residual magnetism is referred to as "flashing the generator".</p>			
		Residual field loss	Flash the generator field terminals to restore residual magnetism.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)	Generator produces no voltage (all phases bad)	Voltage regulator	
			<p>CAUTION</p> <p>To ensure that the voltage regulator is not damaged by the flash potential (raw battery voltage), disconnect the field wires at the voltage regulator.</p>
		Residual field loss	<p>Remove generator field terminal wires #237 and #238 from F+ and F- on regulator.</p> <p>Connect two hookup wires to the battery positive (+) and negative (-) terminals.</p> <p>Connect battery (+) to wire #237 field F+ and battery (-) to wire #238 field F-.</p> <p>After 3 to 5 seconds, remove the battery negative (-) from the F- wire. An inductive arc should result if no arc occurs, repeat the process.</p> <p>Disconnect the hookup wires from the battery and reconnect the field wires to the voltage regulator.</p> <p>Perform voltage regulator adjustment (WP 0079). If adjustment fails isolate to voltage regulator or generator. Proceed to Step 39.</p>
4	Generator produces low voltage (under no load condition)	Fuse blown	<p>Set BATTERY SWITCH to ON.</p> <p>Set ENGINE switch to RUN.</p> <p>Open Genset control panel and observe fuse LEDs.</p> <p>If LED is illuminated, fuse is bad, replace (WP 0040).</p>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
4 (cont.)	Generator produces low voltage (under no load condition)	Output out of adjustment	Verify that Crew troubleshooting tasks (WP 0013) have been completed.
		Under-speed operation	Contact next level of maintenance.
			Verify HERTZ meter shows a reading of 60 HZ +/- 10%.
			If out of tolerance perform governor control adjustment (WP 0081).
		Voltmeter	Set BATTERY SWITCH to ON.
			Start engine.
			Set VOLT/AMP switch to L1.
			Use a DMM to measure 120 VAC +/- 10% across the L1 (black) and L0 (neutral) terminal blocks.
			If the voltage is not within tolerance proceed to the voltage regulator malfunction.
			If the voltage is within tolerance replace the voltmeter (WP 0068) or VOLT/AMP switch (SW1) (WP 0070).
		Voltage regulator	Set BATTERY SWITCH to ON.
			Set CB5 to OFF.
			Set ENGINE switch to OFF.
			Remove two voltage regulator mounting screws to access the underside. Verify the regulator fuse is not blown. Replace fuse if defective (WP 0079).
			Disconnect wires from voltage adjust terminals (6 and 7) of regulator and verify VOLTAGE ADJUST potentiometer on Control Panel sweeps 1000 +/- 10% ohms across the wires. Replace potentiometer (WP 0070) if bad.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
4 (cont.)	Generator produces low voltage (under no load condition)	Voltage regulator	Reconnect the wires to terminals 6 and 7. Perform voltage regulator adjustment (WP 0079). If adjustment fails isolate to voltage regulator or generator. Proceed to Step 39.
5	Generator produces high voltage (under no load condition)	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Output out of adjustment	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
6	Generator produces high voltage (under load condition)	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).
		Output out of adjustment	Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
7	Generator produces low/high voltage (under load condition)	Excessive load	Verify A-C Kilowatts meter reads below the maximum of 18 kW output power. If greater than 18 kW reduce the load.
		Unbalanced load	Use the VOLT/AMP switch to monitor the voltage and current on each phase of the generator.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7 (cont.)	Generator produces low/high voltage (under load condition)	Unbalanced load	If current draw on one phase varies greatly from the others, swap loads to different connectors to balance load.
		Voltage meter	Set BATTERY SWITCH to ON. Start engine. Set VOLT/AMP switch to L1. Use a DMM to measure 120 VAC +/- 10% across the L1 (black) and L0 (neutral) terminal blocks. If the voltage is not within tolerance proceed to the voltage regulator malfunction. If the voltage is within tolerance replace the voltmeter (WP0068).
		Voltage regulator	Set BATTERY SWITCH to ON. Set CB5 to OFF. Set ENGINE switch to OFF. Remove two voltage regulator mounting screws to access the underside. Verify the regulator fuse is not blown. Replace fuse if defective (WP 0079). Disconnect wires from voltage adjust terminals (6 and 7) of regulator and verify VOLTAGE ADJUST potentiometer on Control Panel sweeps 1000 +/- 10% ohms across the wires. Replace potentiometer if bad (WP 0070). Reconnect the wires to terminals 6 and 7. Perform voltage regulator adjustment (WP 0079). If adjustment fails isolate to voltage regulator or generator. Proceed to Step 39.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
8	Generator voltage fluctuates/wanders	<p>Fuse blown</p> <p>Diesel Engine not operating properly</p> <p>Voltage regulator</p>	<p>Set BATTERY SWITCH to ON.</p> <p>Set ENGINE switch to RUN.</p> <p>Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).</p> <p>Verify that Crew troubleshooting tasks (WP 0013) have been completed.</p> <p>Contact next level of maintenance.</p> <p>Set BATTERY SWITCH to ON.</p> <p>Set CB5 to OFF.</p> <p>Set ENGINE switch to OFF.</p> <p>Remove two voltage regulator mounting screws to access the underside. Verify the regulator fuse is not blown. Replace fuse if defective (WP 0079).</p> <p>Disconnect wires from voltage adjust terminals (6 and 7) of regulator and verify VOLTAGE ADJUST potentiometer on Control Panel sweeps 1000 +/- 10% ohms across the wires. Replace potentiometer if sweep isn't smooth or has dead spots (WP 0070).</p> <p>If wires shielded, verify ground continuity of shield.</p> <p>Reconnect the wires to terminals 6 and 7.</p> <p>Perform voltage regulator adjustment (WP 0079). If adjustment fails replace voltage regulator (WP 0079).</p>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
8 (cont.)	Generator voltage fluctuates/wanders	Frequency wandering	<p>Start engine.</p> <p>Set CB5 and CB1 to ON.</p> <p>Operate ECU in heat or cool mode.</p> <p>Verify HERTZ meter frequency is stable. If frequency fluctuates/wanders perform governor adjustment (WP 0081), troubleshoot governor (WP 0029) if adjustment doesn't correct problem.</p>
9	Generator frequency out of tolerance	<p>Fuse blown</p> <p>Generator load unbalanced across all three phases</p> <p>Contaminated fuel/fuel filter</p>	<p>Set BATTERY SWITCH to ON.</p> <p>Set ENGINE switch to RUN.</p> <p>Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040).</p> <p>Verify that Crew troubleshooting tasks (WP 0013) have been completed.</p> <p>Using VOLT/AMP selector switch, check amperage draw across each phase.</p> <p>If draw is not balanced throughout each phase, transfer draw from one phase to another. Primarily done by changing the plug used on the PDU, Leg 1 is CB1 and CB4, Leg 2 is CB2 and CB5, Leg 3 is CB3 and CB6.</p> <p>Remove fuel filter (WP 0044). Inspect fuel and filter.</p> <p>If contamination is suspected, replace fuel filter, drain, and refill fuel tank (WP 0044).</p> <p>Restart engine (WP 0005). If condition persists, contact next level of maintenance.</p>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
9 (cont.)	Generator frequency out of tolerance	Governor failure	Perform governor adjustment (WP 0081). Troubleshoot governor (WP 0029) if adjustment doesn't bring frequency within tolerance.
10	Generator builds voltage from start-up then goes to low voltage	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Genset control panel and observe fuse LEDs. If LED is illuminated, fuse is bad, replace (WP 0040). Verify that Crew troubleshooting tasks (WP 0013) have been completed. Contact next level of maintenance.
		Voltage regulator	Perform regulator adjustment (WP 0079). Replace regulator (WP 0079) if adjustment doesn't correct problem.
11	No reading present on AC meter (A-C AMPERE, HERTZ, A-C KILOWATTS A-C-VOLTS) (M1 – M4)	Bad/incorrect connection	Disconnect terminals from meter. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.
		Bad meter	Test meter as described in (WP 0069). If appropriate reading present on DMM, replace DC VOLTS meter (WP 0069). If appropriate reading not present on DMM. Continue troubleshooting circuit.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
12	No reading present on DC VOLTS meter (M5)	Bad/incorrect connection	Disconnect terminals from meter. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Bad meter	Test DC VOLTS meter as described in (WP 0069). If appropriate input on DMM, replace DC VOLTS meter (WP 0069). If input not present, continue troubleshooting circuit.
13	HOURLMETER (M7) not operating	Bad/incorrect connection	Disconnect terminals from meter. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Bad meter	Ensure connectors CF2 and CM2 are properly connected and no wires are loose. Test HOURLMETER as described in (WP 0069). If appropriate input on DMM, replace HOURLMETER (WP 0069). If input not present, continue troubleshooting circuit.
14	No reading present on BATTERY CHARGER AMPS meter (M9)	Bad/incorrect connection	Disconnect terminals from meter. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Bad meter	Ensure connectors CF2 and CM2 are properly connected and no wires are loose. Test BATTERY CHARGER AMPS meter as described in WP 0106. If appropriate reading on DMM, replace BATTERY CHARGER AMPS meter (WP 0069). If input not present, continue troubleshooting circuit.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
15	No reading present on COOLANT TEMP gauge (M6)	Bad/incorrect connection	<p>Disconnect terminals from gauge.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p> <p>Ensure connectors CF2 and CM2 are properly connected and no wires are loose.</p>
		Bad gauge	<p>Test COOLANT TEMP gauge as described in (WP 0069). If appropriate reading on DMM, replace COOLANT TEMP gauge (WP 0069).</p> <p>If input not present, continue troubleshooting circuit.</p>
16	No reading present on OIL: PRESSURE gauge (M8)	Bad/incorrect connection	<p>Disconnect terminals from gauge.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p> <p>Ensure connectors CF2 and CM2 are properly connected and no wires are loose.</p>
		Bad gauge	<p>Test OIL PRESSURE gauge as described in (WP 0069). If appropriate reading present on DMM, replace OIL PRESSURE gauge (WP 0069).</p> <p>If appropriate reading not present on DMM. Continue troubleshooting circuit.</p>
17	BATTLE SHORT switch (SW5) suspect bad	Bad/incorrect connection	<p>Disconnect terminals from switch.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p> <p>Ensure connectors CF2 and CM2 are properly connected and no wires are loose.</p>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION						
17 (cont.)	BATTLE SHORT switch (SW5) suspect bad	Bad switch	Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to terminals on BATTLE SHORT switch and toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, BATTLE SHORT switch bad, replace (WP 0070).						
18	PANEL LIGHT switch (SW2) suspect bad	Bad/incorrect connection	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.						
		Jumper missing off of ENGINE switch	Check ENGINE switch for jumpers: <table><tr><th>FROM (terminal #)</th><th>TO (terminal #)</th></tr><tr><td>3</td><td>7</td></tr><tr><td>7</td><td>11</td></tr></table>	FROM (terminal #)	TO (terminal #)	3	7	7	11
FROM (terminal #)	TO (terminal #)								
3	7								
7	11								
		Bad PANEL LIGHT switch	Disconnect terminals from PANEL LIGHT switch. Set DMM to read ohms. Connect meter leads to read from terminals #1 to #2 on PANEL LIGHT switch and toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, PANEL LIGHT switch bad, replace (WP 0070).						
19	VOLT/AMP switch (SW1) suspect bad	Bad/incorrect connection	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.						

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION														
19 (cont.)	VOLT/AMP switch (SW1) suspect bad	Bad/incorrect connection	Check switch for jumpers: <table><tr><th>FROM (terminal #)</th><th>TO (terminal #)</th></tr><tr><td>2</td><td>6</td></tr><tr><td>4</td><td>8</td></tr><tr><td>10</td><td>14</td></tr><tr><td>12</td><td>16</td></tr><tr><td>11</td><td>19</td></tr><tr><td>13</td><td>17</td></tr></table>	FROM (terminal #)	TO (terminal #)	2	6	4	8	10	14	12	16	11	19	13	17
		FROM (terminal #)	TO (terminal #)														
2	6																
4	8																
10	14																
12	16																
11	19																
13	17																
		Bad switch	Check for 120 VAC input at across the source side (terminal 1, 5, or 7) of VOLT/AMP switch (SW1) and L0 (neutral) terminal blocks. If 120 VAC (±10%) present at all three inputs of VOLT/AMP switch (SW1) switch is bad. Replace (WP 0070). If 120 VAC (±10%) not present for any phase. Continue troubleshooting circuit.														
20	ENGINE switch (SW3) suspect bad	Jumper missing off of ENGINE switch	Check switch for jumpers: <table><tr><th>FROM (terminal #)</th><th>TO (terminal #)</th></tr><tr><td>3</td><td>7</td></tr><tr><td>7</td><td>11</td></tr></table>	FROM (terminal #)	TO (terminal #)	3	7	7	11								
		FROM (terminal #)	TO (terminal #)														
3	7																
7	11																
		Bad/incorrect connection	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.														
		Bad switch	Replace (WP 0070).														

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION				
21	ENGINE HEATER switch (SW6) suspect bad	Bad/incorrect connection	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.				
		Fuses at Engine heater blown	Check and replace fuses at engine heater.				
		Bad switch	Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to read from terminals #1 to #4 and #2 to #3 on ENGINE HEATER switch (SW6). Toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, ENGINE HEATER switch (SW6) bad, replace (WP 0070).				
22	FUEL LINE HEATER switch (SW8) suspect bad	Jumper missing off of FUEL LINE HEATER switch	Check switch for jumpers: <table><tr><td>FROM (terminal #)</td><td>TO (terminal #)</td></tr><tr><td>3</td><td>4</td></tr></table>	FROM (terminal #)	TO (terminal #)	3	4
FROM (terminal #)	TO (terminal #)						
3	4						
		Bad/incorrect connection	Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2 and CM2 are properly connected and no wires are loose.				
		Bad switch	Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to read from terminals #1 to #4 and #2 to #3 on FUEL LINE HEATER switch (SW8). Toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, FUEL LINE HEATER switch (SW8) bad, replace (WP 0070).				

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
23	HIGH COOLANT TEMP(L3), OVERSPEED(L4) , or LOW OIL PRESSURE (L5) suspect bad	Bad/incorrect connection	<p>Disconnect terminals from light.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p> <p>Ensure connectors CF2 and CM2 are properly connected and no wires are loose. Also check connections at meters (M6 and M8).</p> <p>If all lights are not working check common connection at ENGINE switch (SW3).</p>
24	Control panel light(s) (L1 – L2) suspect bad	Bad socket	<p>Disconnect terminals from bad light and from one "good "light. Re-connect terminals from bad light to "good" light. If light operates, socket bad replace (WP 0071).</p>
24	Control panel light(s) (L1 – L2) suspect bad	Bad/incorrect connection	<p>Disconnect terminals from light.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p> <p>If both lights are not working check common connection at PANEL LIGHTS switch (SW2).</p>
24	Control panel light(s) (L1 – L2) suspect bad	Bad socket	<p>Swap terminals from bad light and from "good "light. If light operates, socket bad replace (WP 0071).</p> <p>If one or both lights still do not work, troubleshoot PANEL LIGHTS switch (SW2).</p>
25	VOLTAGE ADJUST potentiometer (R1) suspect bad	Jumper missing off of potentiometer	<p>Inspect potentiometer for jumper between wiper (center terminal) and max (right terminal).</p> <p>If jumper is damaged, missing or not making good connection repair/replace (WP 0070).</p>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
25 (cont.)	VOLTAGE ADJUST potentiometer (R1) suspect bad	Bad/incorrect connection	Inspect terminals of potentiometer for good solder connections. If solder joints are damaged, missing or not making good connection repair/replace (WP 0070). Disconnect terminals from wiring harness. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Potentiometer bad	Disconnect terminals from potentiometer. Set DMM to read ohms. Connect meter leads to maximum and minimum terminals on potentiometer. Fully rotate shaft on potentiometer. Meter should sweep smoothly from 0Ω to 1,000Ω. If DMM shows any irregularities (i.e., suddenly drops to 0 Ω or is erratic in operation) replace potentiometer (WP 0070).
26	BATTERY SWITCH (SW9) suspect bad	Bad/incorrect connection	Disconnect fuse from battery (WP 0041). Remove panel (WP 0072). Disconnect terminals from switch. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		Bad switch	Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to terminals on BATTERY SWITCH (SW9). Toggle switch. DMM should read open with switch off and short with switch on. IF these conditions are not met, BATTERY SWITCH (SW9) bad, replace (WP 0072).
27	EMERGENCY STOP (SW7) suspect bad	Bad/incorrect connection	Disconnect fuse from battery (WP 0041). Remove panel (WP 0072).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
27 (cont.)	EMERGENCY STOP (SW7) suspect bad	Bad switch	<p>Disconnect terminals from switch.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p> <p>Disconnect terminals from switch. Set DMM to read ohms. Connect meter leads to terminals on EMERGENCY STOP (SW7).</p> <p>Pull switch in and out. DMM should read open with switch in and short with switch out. If these conditions are not met, EMERGENCY STOP (SW7) bad, replace (WP 0072).</p>
28	Circuit Breaker (CB1 – CB5) suspect bad	Bad/incorrect connection	<p>Disconnect fuse from battery (WP 0041). Remove panel (WP 0072).</p> <p>Disconnect terminals from suspect CB.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p>
		Bad circuit breaker (CB1 – CB5)	<p>Disconnect all terminals from suspect CB. Set DMM to read ohms. Connect meter leads to terminals of suspect CB. Toggle CB. DMM should read open with CB off and short with CB on. If these conditions are not met, CB bad, replace (WP 0082).</p>
29	Power distribution panel light(s) (L6 – L10) suspect bad	Bad/incorrect connection	<p>Ensure connectors CF3/CM3 and CF4/CM4 are properly connected and no wires are loose.</p> <p>Disconnect terminals from light.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p> <p>If multiple lights are not working check common connections. (wire #s 117 and 149).</p>

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
29 (cont.)	Power distribution panel light(s) (L6 – L10) suspect bad	Bad socket	Swap terminals from bad light and from "good "light. If light operates, socket bad replace (WP 0074). If one or more lights still do not work, troubleshoot wiring to pin #2 of light(s).
30	Relay (K4, K5, or K6) suspect bad	Bad/incorrect connection	Remove relay from socket. Inspect relay and socket for good connection or corrosion. Clean terminals. Inspect individual wires going into socket for good connection, visible damage and/or corrosion. Re-seat wires as necessary. Ensure connectors CF2/CM2 are properly connected and no wires are loose.
		Bad relay	Relays K4, K5 and K6 are interchangeable. Swap known good relay for suspect relay. If problem moves with relay. Bad relay, replace (WP 0077). If problem does not move with relay, bad socket on barrier panel. Contact next level of maintenance.
31	Relay (K7) suspect bad	Bad/incorrect connection	Remove K7 relay from socket. Inspect relay and socket for good connection or corrosion. Clean terminals. Inspect individual wires going into socket for good connection, visible damage and/or corrosion. Re-seat wires as necessary. Ensure connectors CF2/CM2 are properly connected and no wires are loose.
		Bad relay	If problem does not get resolved, K7 relay is bad replace (WP 0077).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION												
32	Time delay (TDM) suspect bad	Fuse F2 bad	Check F2 ensure LED is not illuminated. If illuminated, replace fuse (WP 0040).												
		Bad/incorrect connection	Disconnect terminals from time delay. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2/CM2 are properly connected and no wires are loose.												
		K7 relay bad	Check K7 relay as described in this WP. Time delay bad, replace (WP 0078).												
33	Watt transducer (XDR) suspect bad	Fuse bad	Check fuses F1 and F3 ensure LED is not illuminated. If illuminated, replace fuse (WP 0040).												
		Bad/incorrect connection	Disconnect terminals from time delay. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2/CM2 are properly connected and no wires are loose.												
		Bad Input	Measure AC input to Watt Transducer: <table border="1"> <thead> <tr> <th>AC INPUT</th><th>FROM</th><th>TO</th><th>DMM Reading</th></tr> </thead> <tbody> <tr> <td>L1</td><td>2</td><td>11</td><td>120 VAC</td></tr> <tr> <td>L3</td><td>8</td><td>11</td><td>120 VAC</td></tr> </tbody> </table>	AC INPUT	FROM	TO	DMM Reading	L1	2	11	120 VAC	L3	8	11	120 VAC
AC INPUT	FROM	TO	DMM Reading												
L1	2	11	120 VAC												
L3	8	11	120 VAC												

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
33 (cont.)	Watt transducer (XDR) suspect bad	Bad current transformer	Shut down Genset (WP 0005). Disconnect fuse from battery (WP 0041). Remove panel (WP 0072). Set DMM to read ohms. Measure resistance across CTs. If DMM reads open, CT bad, replace (WP 0075). Bad watt transducer, replace.
34	Current transformer (CT) suspect bad	Bad/incorrect connection	Disconnect terminals from suspect current transformer. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2/CM2 are properly connected and no wires are loose.
		Bad current transformer	Set DMM to read ohms. Measure resistance across CTs. If DMM reads open, CT bad, replace (WP 0075).
		Bad watt transducer	Troubleshoot watt transducer as described in this WP.
35	Voltage regulator (VR) suspect bad	Fuse bad	Check F1 and F7 ensure LED is not illuminated. If illuminated, replace fuse (WP 0040).
		Bad/incorrect connection	Disconnect terminals from Voltage regulator. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connectors CF2/CM2 are properly connected and no wires are loose.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
35 (cont.)	Voltage regulator (VR) suspect bad	Voltage regulator out of adjustment	Refer to (WP 0079) for the following adjustment procedures: <ul style="list-style-type: none"> • Voltage Output • Stability • V/Hz Roll-Off Freq
		Poor voltage regulation	Replace voltage regulator (WP 0079).
36	Speed sensor (SS) suspect bad	Bad/incorrect connection	Disconnect terminals from speed sensor. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal. Ensure connections to TB1 are properly connected and no wires are loose. Ensure connectors CM1, CM2, CM3, and CM4 are properly connected and no wires are loose.
		Speed sensor bad	Set DMM to read ohms. Measure resistance across pins. 8 and 9 of speed sensor. DMM should read 0 Ω . Measure resistance across pins. 12 and 13 of speed sensor. DMM should read 0 Ω . If any resistance present, replace speed sensor (WP 0080).
		No power to speed sensor	Energize system (WP 0005). Set DMM to read VDC. Measure across pins 1 and 2 of speed sensor for 28 VDC. If 28 VDC not present troubleshoot power source. Set DMM to read VAC. Measure across pins 3 and 4 of speed sensor. If DMM does not read >1.0 VAC rms, replace speed sensor (WP 0080).

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION									
37	Governor controller (GC) suspect bad	<p>Bad/incorrect connection</p> <p>No power to governor controller.</p> <p>No speed signal to governor</p> <p>Governor not tuned or adjusted for engine/application</p> <p>Governor will not adjust.</p>	<p>NOTE</p> <p>Refer to (WP 0081) for brief description of potentiometers and their functionality.</p> <p>Disconnect terminals from governor controller.</p> <p>Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.</p> <p>Ensure connections to TB1 are properly connected and no wires are loose.</p> <p>Ensure connectors CM1, CM2, CM3, and CM4 are properly connected and no wires are loose.</p> <p>Energize system (WP 0005).</p> <p>Set DMM to read VDC.</p> <p>Measure across pins 1 and 2 of governor controller for 12-15 VDC. If voltage not present troubleshoot power source.</p> <p>With the engine running, check for the following:</p> <table><tr><th>FROM (pin #)</th><th>TO (pin #)</th><th>DMM Reading</th></tr><tr><td>2</td><td>3</td><td>5-30 VDC</td></tr><tr><td>2</td><td>4</td><td>5-30 VDC</td></tr></table> <p>If governor does not meet requirements, replace as described in (WP 0081).</p> <p>Perform adjustments for:</p> <ul style="list-style-type: none">• Gain (P2)• Integral Adjust (P3)• Speed (Freq.) (P4)• Derivative (P6) <p>as described in (WP 0118).</p> <p>If governor will not adjust, replace as described in (WP 0081).</p>	FROM (pin #)	TO (pin #)	DMM Reading	2	3	5-30 VDC	2	4	5-30 VDC
FROM (pin #)	TO (pin #)	DMM Reading										
2	3	5-30 VDC										
2	4	5-30 VDC										

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
38	Battery charger (BC) suspect bad	Bad/incorrect connection	Disconnect terminals from speed sensor. Inspect terminal lugs for good connection or corrosion. Clean/replace terminal.
		No 120 VAC to battery charger	Energize system (WP 0005). Set DMM to read VAC. Measure across pins L and N of battery charger for 120 VAC. If 120 VAC not present, check in-line fuse to battery charger. If fuse bad replace, if fuse is good, troubleshoot power source.
		No DC voltage from battery charger	Set DMM to read VDC. Measure across pins + and - of battery charger for 24 VDC. If 24 VDC battery charger bad, replace (WP 0083).
39	Voltage regulator or generator suspect bad	Generator physical damage.	Remove generator covers and perform visual inspection: burnt windings, loose connections, broken wires, frayed insulation, cracked brackets, missing hardware, etc. Check for foreign objects which may have been drawn into the generator. Verify that the generator's air gaps (main rotor and exciter) are free from obstructions.
		Generator insulation breakdown.	Inspect generator for heavy buildup of contamination (dirt, oil, moisture etc.) on the windings. Clean and dry windings.
		Voltage regulator faulty.	Perform the following test to isolate failure to voltage regulator or generator.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
39 (cont.)	Voltage regulator or generator suspect bad.		<p style="text-align: center;">CAUTION</p> <p>To ensure that the voltage regulator is not damaged by applied battery voltage, in step 2 below, disconnect the field wires at the generator junction box and isolate them from contact with any moving or electrical conducting surface.</p> <ol style="list-style-type: none"> 1. Shutdown the Genset (WP 0005). 2. Remove generator junction box cover. Disconnect red F (+) and black F (-) generator field wires at the spade lug connectors. Isolate voltage regulator side of field terminal wires to ensure contact cannot occur with any electrical conducting or rotating surfaces. 3. Connect the multimeter terminals across two generator phase legs (L1 to L2, L1 to L3, or L2 to L3) for line-to-line voltage measurement in step 6 below. <p style="text-align: center;">NOTE</p> <p>In step 4, use only one 12 Volt battery from the 24 Volt series connected battery. Refer to figure 1 for hookup. The voltage regulator feedback circuit will be replaced by a constant battery voltage applied to the generator field terminals.</p> <ol style="list-style-type: none"> 4. Use hookup wire to run jumper connections from the genset battery positive (+) to the red F (+) field wire and negative (-) to the black F (-) generator field wire at the junction box. 5. Start up the genset (WP 0005). Leave CB5 in the OFF position to ensure no load is applied to the generator. 6. Use the multimeter to verify the three line-to-line voltage outputs are within (175 to 240 VAC). 7. If the voltage outputs are correct, replace the voltage regulator. If any voltage measurement fails, replace the generator.

Table 1. Maintainer Troubleshooting – Genset (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
	<p style="text-align: center;">Figure 1. 12V Constant Voltage Test Hookup.</p>		

END OF WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
GENSET – (ENGINE) TROUBLESHOOTING

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0177, Table 2, Item 1)
Multimeter (WP 0177, Table 2, Item 2)

Personnel Required

Power Generation Equipment
Repairer, MOS 91D (2)

Materials/Parts

None

References

WP 0005, WP 0021, WP 0023,
WP 0056, WP 0057, WP 0058,
WP 0059, WP 0060, WP 0061,
WP 0062, WP 0063, WP 0064,
WP 0066, WP 0067, WP 0068,
WP 0069, WP 0066, WP 0070,
WP 0071, WP 0072, WP 0075,
WP 0076, WP 0077, WP 0078,
WP 0079, WP 0080, WP 0091,
WP 0093, WP 0079,

Equipment Condition

Genset Shut Down
Battery Switch OFF
Secondary Power Sources
Disconnected

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the Genset by field Maintainer qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the Genset. This work package is a continuation of the corrective action outlined in the crew level. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

WARNING

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wrist watches, neck chains, and any other jewelry before working around the Genset. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

Tools, equipment, clothing, and your body must be kept clear of rotating parts and electrical connections.

Batteries generate explosive gas during charging. Utilize extreme caution. Do not smoke or use open flame in the vicinity of the battery. Death or severe burns may result.

All fuels generate explosive fumes and gases. Utilize extreme caution. Do not smoke or use open flame when in the vicinity of fuels and associated tanks, lines. Death or severe burns to the crew or damage to the equipment may result.

Table 1. Maintainer Troubleshooting – Genset (Engine).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Coolant leaking	Over flow bottle leaking	Inspect bottle/coolant hose for damage/leaks. Replace if necessary (WP 0069).
		Coolant hoses leaking	Inspect radiator and coolant hoses for damage or loose clamps. Replace if necessary (WP 0069).
		Battery warming tray	Inspect coolant lines/hoses of battery warmer and engine block heater for damage or loose clamps. If clamps are loose, tighten. If damage is present or leaks persist, replace next higher assembly.
		Engine coolant temperature sensor leaking (CTS)	Inspect battery warming tray for leaks. Replace if necessary (WP 0056).
		Engine coolant high temperature switch (CHTS) leaking	Inspect engine coolant temperature CTS) sensor for leaking. If leaking around sensor, remove sensor, apply sealant to threads and replace sensor (WP 0068).
			Inspect engine coolant high temperature switch (CHTS) for leaking. If leaking around CHTS, remove switch, apply sealant to threads and replace switch (WP 0066).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1 (cont.)		Radiator leaking	Inspect radiator for damage/leaks. If damage or leaks are found, remove coolant (WP 0069), replace radiator (WP 0070) and replace coolant (WP 0069).
		Thermostat housing leaking	Inspect thermostat housing and seal for leaks. If leaks are found, remove housing, replace thermostat seal and replace housing (WP 0056).
		Water pump leaking	Inspect water pump and seal for leaks. If water pump is leaking, remove water pump, install new seal, remount water pump and test. If water pump is leaking from front bearing housing or drain port, replace water pump and seal (WP 0074).
		Coolant drain fitting will not lock/leaking	Inspect coolant drain for leaking/functionality. If drain fitting is not functioning or is leaking, replace radiator (WP 0070).
		Engine block heater or associated components leaking	Inspect engine block heater, fuel filter, fuel pump and associated lines. If any leaks are found tighten clamps. If individual component is leaking, replace (WP 0078). If hoses are damaged, replace. (WP 0078). If Engine block heater body is damaged, replace engine block heater (WP 0078).
		Engine head gasket leaking	Contact next level of maintenance.

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
2	Fuel leaking	Fuel filter leaking	Inspect filter for signs of leaking. If leaks are found, replace filter (WP 0062).
		Fuel lines leaking	Inspect fuel lines for leaking, damage, or loose clamps. If clamps are loose, tighten. If fuel lines are damaged or if leaks persist, replace fuel lines (WP 0062).
		Fuel tank leaking	Drain all fuel (WP 0062). Operate generator on alternate fuel source (WP 0005). Inspect fuel tank, if fuel tank is damaged replace fuel tank (WP 0062).
		Fuel tank drain valve will not lock/leaking	Inspect fuel drain valve for damage/signs of leaking. If any damage/leaking is found, drain all fuel, operate generator on alternate fuel source and replace valve or fuel tank (WP 0062).
		Fuel selector switch leaking	Inspect fuel selector for damage, or loose clamps. If clamps are loose, tighten. If damage to selector switch or hoses are found or leaks persist, replace fuel selector switch (WP 0076).
		Auxiliary fuel ports leaking	Inspect fuel ports for damage or loose clamps. If clamps are loose, tighten. If damage to fuel ports or associated hoses are found or leaks persist, replace fuel ports (WP 0076).
		Fuel injectors/Fuel injector lines/Fuel injector pump leaking	Inspect connections. If loose, tighten. If leak persists or if fuel injectors/fuel injector lines are damaged, replace (WP 0077). Replace leaking fuel injector/injector pump (WP 0077).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3	Oil leaking	Oil filter leaking	Inspect filter for signs of leaking. If leaks are found, replace filter (WP 0057).
		Oil pressure sending (OPS) unit leaking	Inspect sending unit for leaking around mounting hardware. If leaks are present, remove sending unit and hardware, coat threads with sealant and replace (WP 0061).
		Low Oil Pressure switch (LOPS) leaking	Inspect switch for leaking around mounting hardware. If leaks are present, remove switch and hardware, coat thread with sealant and replace (WP 0060).
		Oil drain valve will not lock/leaking	Inspect oil drain valve for leaking or damage. If any leaks or damage found replace drain valve (WP 0057).
		Oil drain lines leaking	Inspect oil drain lines for leaking, damage, or loose clamps. If clamps loose, tighten. If damage is found or leaks persist replace drain lines or engine (WP 0057).
		Valve cover/oil pan leaking	Inspect valve cover and oil pan for loose bolts. If loose, tighten. Inspect seals. If seals are damaged replace engine (WP 0079).
		Main engine seals leaking	Inspect front and rear of engine for signs of leaking. Oil leaking from generator indicates a bad rear main seal. If leaks are found replace engine (WP 0079).
4	Battery acid leaking	Battery	Replace battery (WP 0056).
5	Engine does not crank or does not crank normally	Fuse blown	Set BATTERY SWITCH to ON. Set ENGINE switch to RUN. Open Control Panel on Genset and observe LEDs on seven fuse holders. If LED is on, fuse is bad. Replace fuse (WP 0080).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)		Fuse repeatedly blows	<p>Set ENGINE switch to OFF.</p> <p>Set BATTERY SWITCH to OFF.</p> <p>Use continuity measurements on faulty fuse line to isolated component failure.</p> <p>If short to ground, remove components one at a time until ground short is located.</p> <p>If not short to ground, replace faulty fuse and repeat continuity measurement for adjacent power line shorts.</p> <p>If fault not isolated, perform continuity measurements on ENGINE switch and BATTERY SWITCH.</p>
		Low/bad battery	<p>Set BATTERY SWITCH to OFF.</p> <p>NOTE</p> <p>If battery is low, check alternator and belts for proper operation and tension. If necessary, re-adjust belts (WP 0072) or replace alternator (WP 0071).</p> <p>Using multimeter, measure across battery terminals. If multimeter reads:</p>
		Low/bad battery	<p>0 VDC – Replace battery fuse (WP 0056).</p> <p>< 18 VDC - Replace batteries (WP 0056).</p> <p>18 to 24 VDC – Recharge batteries (WP 0023).</p> <p>> 28 VDC - Replace batteries (WP 0056).</p> <p>Set BATTERY SWITCH to ON.</p> <p>Remove NATO/Slave cable from J10 if connected.</p> <p>Remove external charging cable from J7 if connected.</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)			Set CB7 to OFF.
			Crank engine. If engine does not start continue to next possible malfunction. If engine runs, set CB7 to ON, verify battery charge meter fluctuates from 0 more amps. If less than 0 amps (as engine idles), proceed to item 20.
		Connections	Check electrical connections for damaged wires, loose connections, corrosion on connectors. If necessary tighten, clean, or re-connect.
		Starter system	Using multimeter, check for continuity between terminal (2) on K2S starter solenoid (located on front of engine, top solenoid) and engine ground. If no continuity or restricted continuity, check wiring between solenoid and ground for loose connections (see Figure 1). Press START button to start engine.
		Starter system	Using multimeter, measure voltage at terminal (1) on K2S solenoid for 24 to 28 VDC. If 24 to 28 VDC present, check connections from K2S solenoid to starter and from battery to starter before replacing starter (WP 0063). Using a multimeter, measure voltage at terminal (3) on K2S solenoid. If voltage is not between 24 to 28 VDC, troubleshoot engine selector switch (see Table 2 below).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

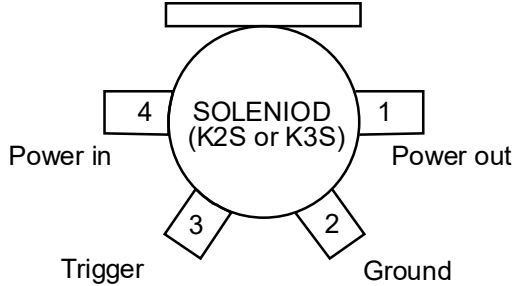
ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
		<p>K2S - Starter</p> <p>K3S - Glow plugs</p>  <p>Figure 1. Solenoids.</p>	
6	Engine cranks but does not start	<p>EMERGENCY STOP button</p> <p>Fuel Valve position</p> <p>Fuse blown</p> <p>Connections</p>	<p>Using a multimeter, measure voltage at terminal (4) on K2S solenoid. If voltage is between 24 to 28 VDC, replace solenoid (WP 0067).</p> <p>Verify that EMERGENCY STOP button is not pushed in by twisting clockwise 1/8 turn.</p> <p>Fuel Valve should be on AUX or Tank, not OFF.</p> <p>Set BATTERY SWITCH to ON.</p> <p>Set CONTROL POWER switch to ON.</p> <p>Open Control Panel on Genset and observe LEDs on seven fuse holders. If LED is on, fuse is bad. Replace fuse (WP 0080).</p> <p>Check electrical connections for damaged wires, loose connections, corrosion on connectors. If necessary tighten, clean, or re-connect.</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
6 (cont.)		Interrupted fuel flow	<p>Remove injection return line at fuel filter. Observe fuel discharge.</p> <p>If fuel observed, check for clogged fuel injectors. If injectors clean, proceed to governor, engine actuator, or speed sensor malfunction (see below).</p> <p>If no fuel is observed, disconnect fuel line from fuel injection nozzle input. Observe fuel discharge.</p> <p>If fuel is observed, check for clogged fuel injectors.</p> <p>If no fuel flow is observed, disconnect fuel line from output of fuel filter. If fuel is observed, replace injection pump (WP 0077).</p> <p>If no fuel flow is observed, disconnect fuel line from output of injection pump.</p> <p>If fuel is observed, replace clogged fuel filter (WP 0062).</p> <p>If no fuel is observed, isolate failure to faulty injection pump or clogged fuel line or clogged, optional fuel pre filter.</p>
		Contaminated fuel/fuel filter	<p>Remove fuel filter (WP 0062). Check for water or other contamination. If contaminated drain fuel tank. Replace fuel and fuel filter (WP 0062).</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
6 (cont.)		Frozen fuel line	<p>If no fuel present, check for frozen or clogged fuel line.</p> <p>Set engine block heater switch to ON.</p> <p>Inspect fuel filter for frozen/jelled fuel. Replace filter if frozen (WP 0062).</p> <p>Use multimeter to measure between 24 to 28 VDC across the engine block heater terminals.</p> <p>If within tolerance, set Engine block heater switch to ON and thaw frozen fuel lines. Restart engine when engine block warm.</p> <p>If out of tolerance, replace engine block heater (WP 0066), or heater circuit breaker CB (WP 0078).</p>
		Glow plug solenoid	<p>Set BATTERY SWITCH to ON, Using multimeter, measure between 24 to 28 VDC across power input (K3S-4) and EBGL terminal (K3S-2)</p> <p>If voltage not within tolerance, use process of elimination to isolate power input failure.</p> <p>Use multimeter to verify ground continuity to glow plug solenoid terminal K3S-2.</p> <p>Using multimeter, measure between 24 to 28 VDC across trigger (K3S-3) and EBGL terminal (K3S-2).</p> <p>If voltage at solenoid trigger K3S-3 is within tolerance isolate to solenoid or glow plug. Replace faulty component.</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
6 (cont.)		Glow plug(s)	<p>Turn BATTERY SWITCH to OFF.</p> <p>Check electrical connections to connecting strip and glow plugs for damaged wire, loose connections, corrosion on connectors. If necessary tighten, clean, or re-connect.</p> <p>Disconnect connector strip. Remove individual glow plug(s). Using multimeter, test glow plug resistance. If resistance is not between 3Ω and 4Ω, replace glow plugs (WP 0059).</p>
		Electrical control malfunction	<p>Press START button to start engine.</p> <p>Activate BATTLE SHORT switch to bypass fault system relays, Figure 3.</p> <p>Use a multimeter to measure for 24 to 28 VDC between governor control terminals 1 and 2.</p> <p>If within tolerance, isolate to stuck open relay (K4, K5, K6).</p> <p>If not within tolerance, use process of elimination to isolate node to shorted governor controller, fuel pump, or relay.</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
7	Engine stops (no warning lights)	Connections	Check electrical connections for damaged wires, loose connections, corrosion on connectors. Tighten if necessary, clean, or re-connect.
		Governor, engine actuator, or speed sensor	Proceed to trouble shoot governor, engine actuator, or speed sensor malfunction, Item 6 above.
		Interrupted fuel flow	Proceed to trouble shoot interrupted fuel flow malfunction, Item 6 above.
8	Engine stops	Engine overheating	<p>Check coolant level. If level is low, replenish fluid.</p> <p>Inspect coolant system for signs of leaking. If leaks found, use visual checks to isolate leaking component and replace.</p> <p>Check oil level. If level is low, replenish oil.</p> <p>If engine oil is contaminated with coolant or other internal mechanical engine component failure is evident. Replace engine (WP 0079).</p> <p>Check fuel injector pump timing (WP 0077). If timing is incorrect, perform timing conformation procedure (WP 0077).</p> <p>Check engine temperature.</p> <p>If temperature reads above 220°F, proceed to coolant system failure below.</p> <p>If temperature reads below 220°F, proceed to engine thermostatic switch malfunction. If engine thermostatic switch is OK, replace engine coolant temperature sending sensor (WP 0068).</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
		Coolant system failure	<p>Inspect engine cooling fan and belt for damage. If damaged, replace belt (WP 0072) or fan (WP 0073).</p> <p>Replace thermostat (WP 0068) and then water pump (WP 0074).</p> <p>If overheating continues inspect generator/engine interface.</p> <p>Remove cover from generator and disconnect generator from engine (WP 0079). Rotate generator manually to ensure free rotation. Replace generator (WP 0079) if damage evident (bearings binding, shaft bent).</p> <p>If no generator damage apparent, replace engine (WP 0079).</p>
		Engine thermostatic switch	<p>Engine must be cool before proceeding.</p> <p>Press STOP button on Control Panel to stop engine.</p> <p>Bypass Engine Coolant High Temperature Shutdown (CHTS) switch by disconnecting it and shorting switch wire #10 and wire #12 together.</p> <p>Verify CHTS switch closed when cool. Test for continuity across switch terminals. If switch is open, replace switch (WP 0066).</p> <p>Attach multimeter across CHTS switch terminals, and restart engine.</p> <p>Monitor continuity across switch as engine warms up. If switch opens prior to engine reaching normal operating temperature, replace switch.</p> <p>Remove bypass. Proceed to fault relay failure.</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
9	Engine stops (triggers LOW OIL PRESSURE alarm)	Engine oil pressure low	<p>CAUTION</p> <p>Operating an engine with low oil pressure can lead to serious damage. If the oil sending unit is functioning properly and the troubleshooting procedure below does not correct the failure replace the engine.</p> <p>Check engine oil level. Add oil if necessary (WP 0021).</p> <p>If any leaks found, isolate leak and replace faulty component.</p> <p>Start engine and monitor oil pressure. If oil pressure does not rise, LOW OIL PRESSURE alarm triggers, and engine shuts down, proceed to oil pressure relay malfunction.</p> <p>If oil pressure raises above 20 psi, and engine shuts down, proceed to oil pressure switch malfunction.</p> <p>Press STOP on Control Panel to stop engine.</p> <p>Bypass Low Oil Pressure Switch (LOPS) by disconnecting it and shorting switch wire #11 and wire #13 together.</p> <p>Start engine, if engine shuts down for over speed fault replace relay (WP 0060).</p> <p>If engine still shuts down for low oil pressure fault, replace governor control relay K7 (WP 0091).</p> <p>Contact next level of maintenance if not resolved.</p>
9 (cont.)		Oil pressure relay	<p>Press STOP on Control Panel to stop engine.</p> <p>Bypass Low Oil Pressure Switch (LOPS) by disconnecting it and shorting switch wire #11 and wire #13 together.</p> <p>Start engine, if engine shuts down for over speed fault replace relay (WP 0060).</p> <p>If engine still shuts down for low oil pressure fault, replace governor control relay K7 (WP 0091).</p> <p>Contact next level of maintenance if not resolved.</p>
		Oil pressure switch	<p>Disconnect wiring from pressure switch and tape off wires so they can not touch.</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
10	Engine stops	Contaminated fuel	<p>Test switch terminal for continuity. If switch is closed, replace switch (WP 0060).</p> <p>Start engine. If switch closes once the pressure reads above 20 psi and remains closed, the switch is good. If the switch opens after the engine has achieved 20 psi, or does not close at all, replace switch (WP 0060).</p> <p>NOTE</p> <p>MOGAS is red in color.</p> <p>Remove fuel filter, inspect fuel for signs of MOGAS. If any MOGAS contamination is suspected, replace the fuel filter, drain, and refill fuel tank with clean fuel (WP 0062).</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
10 (cont.)		Speed switch or over speed relay	<p>Start engine and check HERTZ screen (Metering Screen 2/8). Overspeed frequency switch is set to trip at 64 Hz. If engine shutdown occurs at 64 Hz perform governor adjustment (WP 0091).</p> <p>Press STOP on Control Panel to stop engine.</p> <p>Start engine, if engine shuts down for high temperature fault replace relay.</p> <p>Verify inputs to speed switch. Use multimeter to measure between 24 to 28 VDC across switch terminal 1 (power) and terminal 2 (ground). Use multimeter to measure ground continuity from EBGL to terminal 2 (ground). Measure an open circuit between terminals 11 and 12.</p> <p>Replace Gov. speed control (WP 0093) and engine speed sensor (WP 0064).</p>
11	Engine emits white smoke from exhaust	Contaminated fuel/fuel filter	<p>Check engine oil for proper level. If level is overfull, drain off excess oil and restart engine.</p> <p>Remove fuel filter, check for dirt, obstructions, or contaminated fuel. Replace filter, and/or fuel (WP 0062).</p>
		Engine seals bad	Replace engine (WP 0079).
		Fuel injector pump timing	Check fuel injector pump timing (WP 0077). If timing correct, replace fuel injection pump (WP 0077).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
12	Engine emits blue smoke from exhaust	Clogged/dirt air filter	Inspect air filter, clean/replace (WP 0058).
		Improper oil level	Check engine oil for proper level. If level is overfull, drain off excess oil and restart engine. If coolant is evident in excess oil, replace engine (WP 0079).
		Plugged oil filter	Remove oil filter, check for dirt, obstructions, or other contamination. Replace filter, and/or oil (WP 0057).
13	Engine emits heavy black smoke from exhaust	Clogged air filter	Remove air filter, inspect for excessive dirt or moisture. If un-maintainable, replace air filter (WP 0058).
		Contaminated fuel/fuel filter	Remove fuel filter, check for dirt, obstructions, or contaminated fuel. Replace filter, and/or fuel (WP 0062).
		Fuel injector/injector nozzle/injector pump/line	Fuel injector/injector nozzle/injector pump/line clogged or dirty. Remove components and inspect for excessive dirt. Clean/replace (WP 0077).
		Fuel injector pump timing	Check fuel injector pump timing (WP 0077). If timing correct, replace fuel injection pump (WP 0077).
14	Excessive fuel consumption	Fuel injection pump	Check fuel injector pump timing (WP 0077). If timing correct, replace fuel injection pump (WP 0077).
15	Insufficient Power	Fuel injection pump	Check fuel injector pump timing. If timing correct, replace fuel injection pump (WP 0077).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
16	Excessive carbon deposits on exhaust outlet	Blocked or obstructed muffler/exhaust pipe	Remove muffler exhaust pipe and check for dirt or other obstructions. Clean or replace muffler (WP 0075).
		Exhaust pipe damaged or excessively corroded	Remove exhaust pipe and inspect. If damaged or excessively corroded, replace (WP 0075).
		Contaminated fuel/fuel filter	Remove fuel filter, check for dirt, obstructions, or contaminated fuel. Replace filter, and/or fuel (WP 0062).
17	Engine temperature remains below 120°F (48.88°C)		Adjust governor controller (WP 0091). If adjustment doesn't correct the problem replace engine (WP 0079).
		Fuse blown	Set BATTERY SWITCH to ON. Press START to start engine. Open Control Panel on Genset and observe LEDs on seven fuse holders. If LED is on, fuse is bad. Replace fuse (WP 0080).
		Low coolant level	Allow engine to cool. Inspect engine radiator for proper fluid levels. Check hoses, clamps, and cooling system for leaks.
18	Engine temperature above 220°F (104.4°C), engine still running	Coolant temperature sensor inoperable	Replace coolant temperature sensor (WP 0068).
		Fuse blown	Set BATTERY SWITCH to ON. Open Control Panel on Genset and observe LEDs on seven fuse holders. If LED is on fuse is bad, replace fuse (WP 0080).
		Faulty component	Replace Engine Coolant High Temperature Switch (CHTS) (WP 0066). Start engine. If engine shuts down/overheats, conduct troubleshooting procedure for Engine Stops (HIGH COOLANT TEMP Alarm) item 9.

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
19	Engine oil pressure below 10 psi, engine still running	Fuse blown	Set BATTERY SWITCH to ON. Open Control Panel on Genset and observe LEDs on seven fuse holders. If LED is on fuse is bad, replace fuse (WP 0080).
		Faulty component	Check engine oil level. If necessary, add oil (WP 0021). Start engine and observe OIL PRESSURE reading. If oil pressure does not come up to proper level (+20 psi), replace oil pressure switch (WP 0060). Start engine and observe OIL PRESSURE reading. If oil pressure does not come up to proper level, (+20 psi), replace oil pressure sending unit (WP 0061). If oil pressure does not reach normal operating level replace engine (WP 0079).

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
<p style="text-align: center;">NOTE</p> <p>The fault code is determined by the number of times the Engine block heater switch flashes (i.e. one flash is F01, two flashes is F02, etc.).</p> <p style="text-align: center;"><u>Internal Safety Cut Off Switch Reset Procedure:</u></p> <ol style="list-style-type: none"> 1. Set Engine block heater switch to OFF. 2. Set ENGINE switch to OFF. 3. Set BATTERY SWITCH to OFF. 4. Set BATTERY SWITCH to ON. 			
20	Engine block heater will not start (no fault code)	<p>Fuse blown</p> <p>Power/control interrupted</p>	<p>Remove cover from Engine block heater fuse block. Remove fuses and inspect. Replace if necessary (WP 0078).</p> <p>If fuse blows repeatedly. Inspect electrical connections for shorted wires at input terminals.</p> <p>Replace Engine block heater (WP 0078).</p> <p>Ensure BATTERY and Engine block heater switches are set to ON.</p> <p>Use multimeter to verify ground continuity from EBGL to Engine block heater terminals X2-2(wire #409) and X1-5 (wire # GN) (see Fig. 4)</p> <p>Test for between 24 to 28 VDC at Engine block heater terminal X2-1 (wire #RD4) and X1-2 (wire #YL). Use wire #409 as ground reference.</p> <p>If not within tolerance isolate to Engine block heater or Engine block heater switch SW6. Replace faulty component.</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

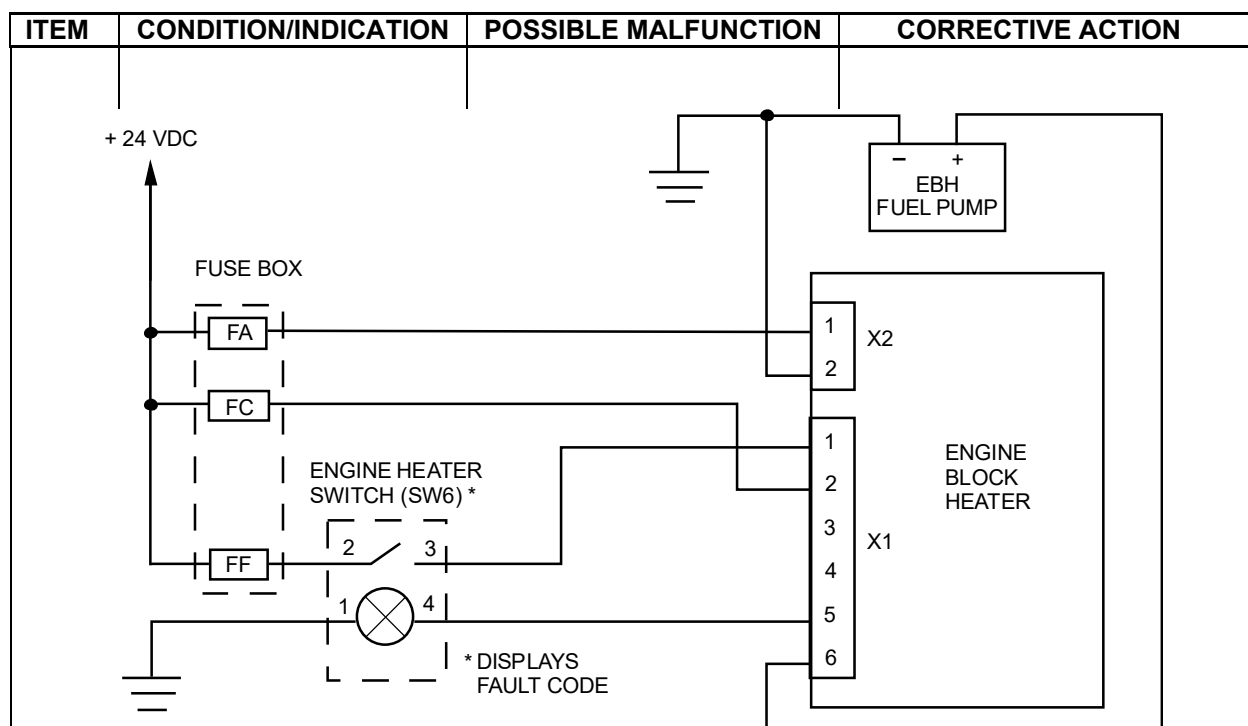


Figure 2. Engine Block Heater System.

21	Engine block heater (fault code F01 or F02)	<p>Fuel source interrupted</p> <p>Fuel filter clogged</p> <p>Engine block heater fuel pump inoperable</p>	<p>Verify fuel level, add fuel if necessary.</p> <p>Inspect fuel line for damage or loose connections. If loose, tighten, reset and restart. If damaged replace (WP 0078).</p> <p>Remove and inspect fuel filter for debris. If filter is clogged, replace filter (WP 0078).</p> <p>Reset internal safety cutoff switch.</p> <ol style="list-style-type: none"> 1. Set Engine block heater switch to OFF. 2. Set BATTERY SWITCH to OFF. 3. Set BATTERY SWITCH to ON. 4. Set Engine block heater switch to ON. <p>Check fuse, replace if necessary (WP 0078).</p>
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Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
21 (cont.)		Engine block heater switch	<p>Turn on engine block heater, listen for fuel pump operation. If pump does not operate after 15 seconds, disconnect cable at fuel pump, and test for 24 to 28 VDC. If voltage is between 24 and 28 VDC, replace fuel pump (WP 0078).</p> <p>If voltage is not present, proceed to Engine block heater switch malfunction (see below).</p> <p>Reset internal safety cutoff switch.</p> <p>Set Engine block heater switch to OFF.</p> <ol style="list-style-type: none"> 1. Set Engine block heater switch to OFF. 2. Set CONTROL POWER switch to OFF. 3. Set BATTERY SWITCH to OFF. 4. Set BATTERY SWITCH to ON. 5. Set CONTROL POWER switch to ON. 6. Set engine block heater switch to ON. <p>Use multimeter to measure between 24 to 28 VDC across Engine block heater terminal X1-1 (wire # BK) and X1-5 (wire # GN).</p> <p>If within tolerance, replace Engine block heater (WP 0066).</p> <p>If not within tolerance, use multimeter to measure between 24 to 28 VDC across Engine block heater switch SW6 terminal 2 (wire # 424) and X1-5 (wire # GN).</p> <p>If within tolerance replace Engine block heater switch</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
22	Engine block heater (fault code F03)	Battery voltage not within acceptable limits	<p>SW6.</p> <p>If not within tolerance, use process of elimination to isolate failure to SW6, SW8, or fuse FF.</p> <p>Check battery voltage. If less than 24 VDC, recharge batteries (WP 0023). Internal safety cut off switch must be reset as follows:</p> <ol style="list-style-type: none"> 1. Set Engine block heater switch to OFF. 2. Set CONTROL POWER switch to OFF. 3. Set BATTERY SWITCH to OFF. 4. Set BATTERY SWITCH to ON. 5. Set CONTROL POWER switch to ON. 6. Set engine block heater switch to ON. <p>Check battery voltage using multimeter. If greater than 28 VDC, troubleshoot batteries. If battery voltage is 24 to 28 VDC, replace engine block heater (WP 0078).</p>
23	Engine block heater (fault code F04, F05, F06, F08, F09, F10)	Engine block heater bad	Replace engine block heater (WP 0078).
24	Engine block heater (fault code F07)	Fuel pump wiring damaged	Repair damaged wiring.
		Fuel pump inoperable	<p>Check fuse, replace if necessary (WP 0078).</p> <p>Internal safety cut off switch must be reset as follows:</p> <ol style="list-style-type: none"> 1. Set Engine block heater switch to OFF. 2. Set CONTROL POWER

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
			<p>switch to OFF.</p> <p>3. Set BATTERY SWITCH to OFF.</p> <p>4. Set BATTERY SWITCH to ON.</p> <p>5. Set CONTROL POWER switch to ON.</p> <p>6. Set engine block heater switch to ON.</p> <p>Turn on engine block heater, listen for fuel pump operation. If pump does not operate after 15 seconds, disconnect cable at fuel pump, and test for 24 to 28 VDC. If voltage is between 24 and 28 VDC, replace fuel pump (WP 0078).</p> <p>If voltage is still not present, proceed to Engine block heater switch malfunction, item 24, (see above).</p>

Table 1. Maintainer Troubleshooting – Genset (Engine) – Continued.

NOTE

When engine block heater switch (on Genset control panel) flashes, there is a problem with the engine block heater. The number of flashes indicates a specific fault code (i.e., one flash is F01, two flashes is F02).

There is a sequence of slow and fast flashes. Count the slow flashes.

Table 2. Engine Block Heater Fault Codes.

FAULT CODE	DESCRIPTION	POSSIBLE CAUSE
F01	No Start-up	<ul style="list-style-type: none"> Fuel Supply Restricted Air Flow Through Intake or Exhaust
F02	Flame Extinguished.....	<ul style="list-style-type: none"> Fuel Supply Restricted Air Flow Through Intake or Exhaust
F03	Under/Over voltage	<ul style="list-style-type: none"> Vehicle Charging System.
F04	Premature Flame Detection	<ul style="list-style-type: none"> Engine block heater faulty
F05	Circulating Pump Interruption or Short Circuit ...	<ul style="list-style-type: none"> Open or Shorted Wiring Defective Pump
F06	Temperature Sensor Interruption or Short Circuit	<ul style="list-style-type: none"> Engine block heater faulty
F07	Metering Pump (Fuel pump) Interruption or Short Circuit	<ul style="list-style-type: none"> Open or Shorted Wiring
F08	Combustion Fan Motor Interruption, Short Circuit or Incorrect fan Speed.....	<ul style="list-style-type: none"> Engine block heater faulty
F09	Pencil Type Glow Plug/Flame Detector Interruption or Short Circuit	<ul style="list-style-type: none"> Engine block heater faulty
F10	Overheating Condition	<ul style="list-style-type: none"> Coolant Flow Restriction Circulation Pump

END WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
ECU – (ELECTRICAL/AUXILIARY HEATER) TROUBLESHOOTING

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0151, Table 2, Item 1)
Multimeter (WP 0151, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

WP 0005, WP 0090
WP 0041, WP 0042, WP 0096
WP 0090, WP 0024, WP 0024
WP 0096, WP 0098

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the Environmental Control Unit (ECU) by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the ECU. It is assumed that crew level troubleshooting was performed. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

WARNING

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Remove rings, bracelets, wrist watches, neck chains, and any other jewelry before working around the ECU. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

NOTE

There are individual tests at the end of this WP for certain electronic components inside the ECU. These components are:

- Mode select switch – Test..... 0024-21
- Thermostat – Test..... 0024-22
- Circuit breakers – Test..... 0024-23
- Compressor motor starter protector – DC Voltage Test 0024-24
- Heater contactor – Test 0024-25
- CMSP/EMSP AC Voltage – Test 0024-26
- Bridge Rectifier - Test 0024-27
- Transformer - Test 0024-28

Prior to removing these components verify their status by performing these tests.

Table 1. Maintainer Troubleshooting – ECU.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	ECU will not run on source power	<p>Power interrupted at source. Green POWER light not lit or dim</p> <p>CB1 bad</p>	<p>Verify that:</p> <ul style="list-style-type: none"> • Proper connections are made (WP 0005). • source power operational. • Proper voltage present. • Circuit breaker(s) set to ON. <p>Operate ECU on source power to ensure ECU is operating properly.</p> <p>Proceed to troubleshoot CB1 malfunction.</p> <p>Set MODE SELECT Switch (MSS) to OFF.</p> <p>Set AUXILIARY HEAT Selector Switch (AHSS) to OFF.</p> <p>Reset CB1 if tripped. If CB1 trips again isolate failure to thermostat, reverse phase relay, MSS, or CB1.</p> <p>Use multimeter to measure 24 VAC at CB1 input wire #1412.</p> <p>If 24 VAC is not present, proceed to CB2 malfunction.</p> <p>Replace CB1 (WP 0090).</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1 (cont.)		CB2 bad	<p>Ensure MSS and AUXILIARY HEAT switches are set to OFF.</p> <p>Reset CB2 if tripped. If CB2 trips again isolate failure to panel heater, Phase Sensing Relay (PSR), Control Transformer (TX1), or CB2.</p> <p>Use multimeter to measure 208 VAC across transformer TX1 input wire #1331 and wire #1341.</p> <p>If 208 VAC +/- 10 % replace transformer (WP 0047).</p> <p>Use multimeter to measure 208 VAC across CB2 input wire #1071 and wire #1081.</p> <p>If 208 VAC +/- 10% is not present, refer to next level of maintenance.</p> <p>Use multimeter to measure 208 VAC across CB2 input wire #1071 and wire #1091.</p> <p>If 208 VAC +/- 10% is not present, refer to next level of maintenance.</p> <p>Replace CB2 (WP 0042).</p>
		Voltage OUT OF PHASE (OPL). Red OUT OF PHASE light illuminated	<p>Ensure MSS and AUXILIARY HEAT switches are set to OFF.</p> <p>Disconnect ECU pigtail from power source.</p> <p>Change order of ØA, ØB or ØC input connections (inside ECU control panel) (see FO-1 and FO-2).</p> <p>Connect ECU pigtail to power source and energize ECU.</p> <p>If red OUT OF PHASE light is still illuminated, repeat steps.</p> <p>If problem persists, replace reverse phase relay.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1 (cont.)		Power interrupted at source. Green POWER light not lit or dim	<p>Verify that:</p> <ul style="list-style-type: none"> • Proper connections are made (WP 0005). • Proper voltage present. • CB1 and CB2 set to ON. <p>Operate ECU on source power to ensure ECU is operating properly.</p> <p>If not operating properly, proceed to Item 1 of this table and troubleshoot CB1 malfunction.</p>
		Voltage OUT OF PHASE. Red OUT OF PHASE light illuminated	<p>Ensure MSS and AUXILIARY HEAT switches are set to OFF.</p> <p>Disconnect ECU pigtail from power source.</p> <p>Change order of ØA, ØB or ØC input connections (inside ECU control panel) (see FO-1 and FO-2).</p> <p>Connect ECU pigtail to power source and energize ECU.</p> <p>If red OUT OF PHASE (OPL) light is still illuminated, repeat steps.</p> <p>If problem persists, replace phase relay (WP 0092).</p> <p>Contact next level of maintenance.</p>
2	ECU will not run in FAN mode	Power interrupted	<p>Set MSS switch to OFF.</p> <p>Set CB1 and CB2 to ON. Ensure OPL light is OFF and POL light is ON. If either circuit breaker trips or indicator incorrect proceed to Item 1.</p> <p>Set MSS switch to FAN.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
2 (cont.)		Evaporator fan motor bad	<p>If Evaporator Motor Starter Protector (EMSP) is tripped, reset starter protector.</p> <p>If starter protector trips again isolate failure to faulty EMSP or evaporator fan motor. Replace faulty component.</p> <p>Inspect evaporator fan belt and motor for damage. Replace if needed.</p> <p>Proceed to evaporator fan motor malfunction.</p> <p>Ensure MSS switch set to FAN.</p> <p>Use multimeter to measure 208 VAC across fan input T1 (wire # 1092) and T2 (wire #1082).</p> <p>If 208 VAC +/- 10 % proceed to EMSP/contactator malfunction.</p> <p>Use multimeter to measure 208 VAC across fan input T1 (wire # 1092) and T3 (wire #1072).</p> <p>If 208 VAC +/- 10 % is not present, proceed to EMSP/contactator malfunction.</p> <p>Replace evaporator fan motor.</p>
		Evaporator Motor Starter Protector (EMSP)/contactor bad	<p>Use multimeter to measure 24 VAC at evaporator contactor control, from wire #1472 to neutral.</p> <p>If 24 VAC +/- 10 % is not present, proceed to MSS switch malfunction.</p> <p>Isolate failure to EMSP or evaporator contactor. Reset/replace faulty component.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
2 (cont.)		Mode Select Switch (MSS) bad	<p>Use multimeter to measure 24 VAC at MSS switch input, from wire #1471 to neutral.</p> <p>If 24 VAC +/- 10 % is present, replace MSS switch (WP 0096).</p> <p>If 24 VAC +/- 10% is not present, replace reverse phase sensing relay.</p>
3	ECU won't run (or conditioned air too warm) in COOL mode	Thermostat bad	<p>Set CB1 and CB2 to ON</p> <p>Set MSS switch to FAN. Ensure evaporator fan works. Proceed to Item 3, if fan doesn't work.</p> <p>Set MSS switch to COOL. Both evaporator and condenser fans should be working. Proceed to condenser fan malfunction If not working.</p> <p>Set thermostat to 40°F.</p> <p>Use multimeter to measure 24 VAC across liquid solenoid valve, from TB1-3 (wire #1561) to TB1-4 (wire #1413).</p> <p>If 24 VAC +/- 10 % is present, proceed to compressor malfunction.</p> <p>Use multimeter to measure 24 VAC at MSS switch input, from TB1-2 (wire #1513) to TB1-4 (wire #1413).</p> <p>If 24 VAC +/- 10 % is present, replace MSS switch (WP 0096).</p> <p>Use multimeter to measure 24 VAC at thermostat output, from TB1-1 (wire #1512) to TB1-4 (wire #1413).</p> <p>If 24 VAC +/- 10 % is present, replace high temperature cutout (WP 0096).</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)		Compressor bad	<p>If 24 VAC +/- 10% is not present, replace thermostat (WP 0047).</p> <p>If compressor is ON, but not producing cold air, proceed to troubleshoot heating and cooling.</p> <p>Use multimeter to measure 208 VAC across compressor input wire #1181 and wire #1191.</p> <p>If 208 VAC +/- 10% is not present, proceed to Compressor Motor Starter Protector (CMSP) or Compressor Contactor (CC1) malfunction.</p> <p>Use multimeter to measure 208 VAC across compressor input wire #1181 and wire #1201.</p> <p>If 208 VAC +/- 10% is not present, proceed to CMSP/CC1 malfunction.</p> <p>Recover and recharge refrigerant.</p> <p>If compressor fails to turn on after recharging, replace compressor.</p>
		Time Delay (TD) relay	<p>Use multimeter to measure 24 VAC at TD relay input, from TB1-6 (wire #1602) to neutral (wire #1413).</p> <p>If 24 VAC +/- 10% is not present, proceed to High Pressure Cutout (HPC) malfunction.</p> <p>Replace TD relay.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)	<p style="text-align: center;">NOTE</p> <p>When troubleshooting the high and low pressure sensors within the refrigerant lines it is critical that the system is properly charged.</p> <p>Recover and recharge the refrigerant (WP 0098). Verify failure re-occurs before proceeding.</p>		
		High Pressure Cutout (HPC)	<p>Manually reset HPC if needed.</p> <p>Use multimeter to measure 24 VAC at HPC input, from TB1-5 (wire #1601) to neutral (wire #1413).</p> <p>If 24 VAC +/- 10% is not present, proceed to Low Pressure Cutout (LPC) malfunction.</p> <p>Replace HPC.</p>
		Low Pressure Cutout (LPC)	<p>Use multimeter to measure 24 VAC at LPC input, from TB1-5 (wire #1601) to neutral (wire #1413).</p> <p>If 24 VAC +/- 10% is not present, replace MSS switch (WP 0024).</p> <p>Replace LPC.</p>
		Condenser fan	<p>Ensure CB1 and CB2 are set to ON.</p> <p>Ensure MSS switch is set to COOL.</p> <p>Use multimeter to measure 208 VAC across condenser fan input wire #1121 and wire #1131.</p> <p>If 208 VAC +/- 10% is not present, proceed to Condenser Motor Starter Protector (CMSP) or contactor malfunction.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
3 (cont.)			<p>Use multimeter to measure 208 VAC across condenser fan input wire #1121 and wire #1141.</p> <p>If 208 VAC +/- 10% is not present, proceed to CMSP/contactor malfunction.</p> <p>Replace condenser fan.</p>
		Condenser Motor Starter Protector (CMSP)/contactor	<p>Use multimeter to measure 24 VAC at contactor control, from wire #1571 to neutral.</p> <p>If 24 VAC +/- 10% is not present, replace MSS switch (WP 0024).</p> <p>Reset CMSP if tripped. If starter protector trips again isolate failure to CMSP or condenser fan motor. Replace faulty component.</p> <p>Isolate to CMSP or contactor. Replace faulty component.</p>
4	ECU won't run in LOW HEAT mode (or air too cool)	Evaporator fan motor	<p>Ensure CB1 and CB2 are set to ON.</p> <p>Ensure CB3, CB4, and AUXILIARY HEAT are set to OFF</p> <p>Set MSS switch to LOW HEAT and adjust thermostat to 100°F.</p> <p>If evaporator fan operates, proceed to low heater coil malfunction.</p> <p>Set MSS switch to FAN.</p> <p>If evaporator fan operates replace MSS switch, (WP 0096).</p> <p>Proceed to ECU won't run in FAN mode condition, ITEM 3.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
4 (cont.)		Low heater coil	<p>Set low heat coil circuit breaker CB4 to ON.</p> <p>Use multimeter to measure 208 VAC across low heat coil input wire #1232 and wire #1242.</p> <p>If 208 VAC +/- 10% is not present, proceed to low heat contactor malfunction.</p> <p>Use multimeter to measure 208 VAC across low heat coil input wire #1232 and wire #1252.</p> <p>If 208 VAC +/- 10% is not present, proceed to low heat contactor malfunction.</p> <p>Low heater coil faulty, refer to next level maintenance.</p>
		Low heat temperature (LHT) contactor control	<p>Use multimeter to measure 24 VAC at low heat contactor control, from wire #1531 to neutral (wire # 1413).</p> <p>If 24 VAC +/- 10% is not present, proceed to MSS switch malfunction.</p> <p>Use multimeter to measure 208 VAC across low heat contactor input wire #1231 and wire #1241.</p> <p>If 208 VAC +/- 10% is not present, replace CB4 (WP 0090).</p> <p>Use multimeter to measure 208 VAC across low heat contactor input wire #1231 and wire #1251.</p> <p>If 208 VAC +/- 10% is not present, replace CB4 (WP 0090).</p> <p>Reset or replace low heat contactor (WP 0091).</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
4 (cont.)		MSS switch	Use multimeter to measure 24 VAC at MSS switch, from input TB1-2 (wire #1513) to neutral TB1-4 (wire #1413). If 24 VAC +/- 10% is not present, proceed to HTC switch malfunction. Replace MSS switch (WP 0096).
		High Temperature Cutout (HTC) switch	Use multimeter to measure 24 VAC at HTC switch, from input TB1-1 (wire #1512) to neutral TB1-4 (wire #1413). If 24 VAC +/- 10% is not present, replace thermostat (WP 0047). Replace HTC switch (WP 0096).
<p style="text-align: center;">NOTE</p> <p>Since the evaporator fan motor has only one speed, a baffle in the return air duct is used to regulate air flow.</p> <p>Operating the ECU in HEAT mode with the baffle closed will increase heat production.</p>			
5	ECU won't run in HIGH HEAT mode (or air too cool)	High heater coil	Verify that ECU runs in LOW HEAT mode before continuing. Ensure AUXILIARY HEAT set to OFF. Ensure CB1, CB2, CB3, and CB4 are set to ON. Set MSS switch to HIGH HEAT. Adjust thermostat to 100°F. If both high and low heat coils are getting hot (glowing) replace evaporator fan motor.

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)		High heat contactor (HHT)	<p>Shut off low heat coil. Set CB4 to OFF.</p> <p>Use multimeter to measure 208 VAC across high heat coil input wire #1282 and wire #1292.</p> <p>If 208 VAC +/- 10% is not present, proceed to high heat contactor malfunction.</p> <p>Use multimeter to measure 208 VAC across high heat coil input wire #1282 and wire #1302.</p> <p>If 208 VAC +/- 10% is not present, proceed to high heat temperature (HHT) contactor malfunction.</p> <p>High heater coil faulty. Refer to next level maintenance.</p> <p>Use multimeter to measure 24 VAC at high heat contactor control, from wire #1514 to neutral (wire # 1413).</p> <p>If 24 VAC +/- 10% is not present, proceed to MSS switch malfunction.</p> <p>Use multimeter to measure 208 VAC across high heat contactor input wire #1281 and wire #1291.</p> <p>If 208 VAC +/- 10% is not present, replace CB3 (WP 0090).</p> <p>Use multimeter to measure 208 VAC across high heat contactor input wire #1281 to #1301.</p> <p>If 208 VAC +/- 10% is not present, replace CB3 (WP 0090).</p> <p>Reset or replace high heat contactor.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)		MSS switch bad	Use multimeter to measure 24 VAC at MSS switch, from input TB1-2 (wire #1513) to neutral TB1-4 (wire #1413). If 24 VAC +/- 10% is not present, proceed to HTC switch malfunction. Replace MSS switch (WP 0096).
		HTC switch bad	Use multimeter to measure 24 VAC at HTC switch, from input TB1-1 (wire #1512) to neutral TB1-4 (wire #1413). If 24 VAC +/- 10% is not present, replace thermostat. The HTC switch shuts off power to the heat coils, if enclosure temperature exceeds 180°F. Replace HTC switch (WP 0096) if temperature below 180°F.
6	Auxiliary heater won't start in MANUAL mode (no fault code)	Fuse inside ECU control panel bad (see Figure 1). +24 VDC power interrupted	Fuse F1, F2, or F3 bad. Replace fuse (WP 0098). Make the following selections: CB1 AND CB2 to ON. MSS switch to FAN. AUXILIARY HEAT to MANUAL.

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
			<p>Use multimeter to measure +24 VDC from auxiliary heat turn-on signal input, TB2-8 (wire #1653) to ground bus.</p> <p>If +24 VDC +/- 10 % is not present, then proceed to AUXILIARY HEAT switch malfunction.</p> <p>Replace auxiliary heater (WP 0098).</p>
6 (cont.)		CMSP AUX relay (P/O CMSP/contactor)	<p>Use multimeter to measure +24 VDC across CMSP AUX relay input TB2-5 (wire #1651) to ground bus.</p> <p>If + 24 VDC +/- 10 % is not present, proceed to +24 VDC Power Supply malfunction.</p> <p>Verify ECU functions in FAN mode before replacing condenser contactor of CMSP/contactor pair.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
		+24 VDC Power Supply	<p>Ensure power supply selector switch A is OFF and B is ON.</p> <p>Use multimeter to measure +24 VDC across power supply terminals (+) and (-).</p> <p>If + +24 VDC +/- 10 % is present, then replace F3 fuse.</p> <p>If voltage is greater than +20 VDC then set output to +24 VDC using adjustment screw. If adjustment fails, replace power supply before replacing auxiliary heater (WP 0098).</p> <p>If power supply SHUTDOWN LED is red the +24 VDC power supply is in Shutdown mode. Shutoff Source (or shore power).</p> <p>Wait at least 20 seconds for power supply to automatically reset.</p> <p>Power up the ECU. If power supply returns to Shutdown mode, replace auxiliary heater or power supply.</p>
7	Auxiliary heater won't start in AUTO mode (no fault code)	AUXILIARY HEAT selector switch (AHSS)	<p>Set thermostat to 100°F.</p> <p>Verify ECU runs in LOW HEAT mode. If malfunction occurs troubleshoot in accordance with ITEM 5, this table.</p> <p>Verify auxiliary heater starts in AUXILIARY HEAT MANUAL mode. If malfunction occurs troubleshoot in accordance with ITEM 7, this table.</p> <p>With ECU running in LOW HEAT mode and auxiliary heater in MANUAL, place AUXILIARY HEAT switch in AUTO mode.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
			<p>Use multimeter to measure +24 VDC at the LHT contactor relay input (wire #1651) to ground bus.</p> <p>If +24 VDC +/- 10% is present, replace the LHT contactor (WP 0024).</p>
<p style="text-align: center;">NOTE</p> <p>If power is cut off from auxiliary heater for any reason, the auxiliary heater internal safety cut off switch must be reset as follows:</p> <p>Due to length of fuel line to ECU, always make two attempts when restarting.</p> <p>Auxiliary Heater Reset Procedure</p> <ul style="list-style-type: none"> • Power down ECU (WP 0005). • Disconnect power source (i.e., Source, shore power) from ECU for one minute. • Reconnect power source and recheck. • If code has not cleared, repeat reset procedure two more times. 			
8	Auxiliary heater will not start (fault code F01 or F02)	<p>Fuel source interrupted</p> <p>Fuel filter clogged</p> <p>Fuel contaminated</p> <p>Air intake/exhaust restricted or plugged.</p>	<p>Inspect fuel line for damage or loose connections. If loose, tighten, reset and restart. If damaged, replace fuel lines (WP 0098).</p> <p>If fuel line frozen, verify fuel line heater works by actuating the Fuel Line Heater switch at the Source and feeling warmth of element.</p> <p>Remove and inspect fuel filter for debris. If filter is clogged, replace filter (WP 0098). Reset and restart.</p> <p>Drain and replace fuel in Source fuel tank.</p> <p>Inspect air intake and exhaust for debris. Remove debris then reset and restart.</p>

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
		Ignition system	Auxiliary heater malfunction replace auxiliary heater (WP 0098).
9	Auxiliary heater (fault code F03, F04, F05, F06, F07, F08, F09, F011)	Auxiliary heater faulty	Auxiliary heater malfunction, replace auxiliary heater (WP 0098).
10	Auxiliary heater (fault code F10)	System overheating	Allow system to cool down then drain and replace coolant. Perform auxiliary heater reset procedure (see NOTE above). If fault returns replace auxiliary heater (WP 0098).
		Circulation pump motor	Use multimeter to measure 24 VDC between pump power (black wire) and ground (brown wire). If +24 VDC +/- 10% is not present, replace auxiliary heater (WP 0046). If +24 VDC +/- 10% is present, isolate problem to faulty pump. Replace faulty component.
11	Auxiliary heater (fault code F12)	Heater lockout	Perform auxiliary heater reset procedure (see NOTE above). If fault returns, replace auxiliary heater (WP 0098).
12	Coolant leaking from auxiliary heater/hoses	Coolant hose, reservoir, or evaporator coil bad	Shutdown ECU and allow system to cool. Wipe coolant from all surfaces. Inspect for leaks. Tighten hose clamps if loose. Make the following selections: CB1 and CB2 to ON. MSS switch to FAN. AUXILIARY HEAT to MANUAL.

Table 1. Maintainer Troubleshooting – ECU – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
13	Fuel leaking from auxiliary heater	Fuel lines, fuel pump, fuel filter, or heater leaking	<p>Inspect surface for leak. Allow heater to reach normal operating condition if necessary.</p> <p>Visually isolate source of leak and replace faulty component.</p> <p>Shutdown ECU and allow system to cool. Wipe fuel from all surfaces.</p> <p>Inspect filter for signs of leaking. If leaks are identified, replace filter (WP 0098).</p> <p>Inspect fuel lines of auxiliary heater for leaking, damage, or loose clamps. If clamps loose, tighten.</p> <p>Make the following selections: CB1 and CB2 to ON. MSS switch to FAN. AUXILIARY HEAT to MANUAL.</p> <p>Inspect auxiliary heater surface for leak. Allow heater to reach normal operating condition if necessary.</p> <p>Visually isolate source of leak and replace faulty component.</p>

NOTE

When AUXILIARY HEAT switch (on ECU Control Panel) flashes, there is a problem with the auxiliary heater. The number of flashes indicates a specific fault code (i.e., one flash is F01, two flashes is F02).

There is a sequence of slow and fast flashes. Count the slow flashes.

Table 2. ECU Auxiliary Heater Fault Codes.

FAULT CODE	DESCRIPTION	POSSIBLE CAUSE	CORRECTION
F01	No Start-up	Fuel Supply (lack of fuel) Restricted Air Flow	Check fuel tank for fuel. Check fuel line for blockage, kink or leaks. Check air lines for blockage or kink.
F02	Flame Extinguished (During Operation)	Fuel Supply (lack of fuel) Restricted Air Flow	Check fuel tank for fuel. Check fuel line for blockage, kink or leaks. Check air lines for blockage or kink.
F03	Under/Over voltage	Bad electrical connection(s)	Check electrical connections.
F04	Premature Flame Detection	Heater faulty	Check electrical connections.
F05	Defective flame detector	Bad electrical connection(s) Defective fame detector	Check electrical connections.
F06	Temperature Sensor	Bad electrical connection(s)	Check electrical connections.
F07	Fuel solenoid valve	Bad electrical connection(s)	Check electrical connections.
F08	Fan Motor Interruption	Bad electrical connection(s)	Electrical connections. Motor bad.
F09	Not used		
F10	Overheating Condition	Coolant Flow Restriction Circulation Pump	Check electrical connections.
F011	Auxiliary heater will not start	Heater faulty	Check electrical connections
F012	Auxiliary heater will not start	Heater faulty	Heat controller lock-out due to excessive error codes.

MODE SELECT SWITCH – TEST

INITIAL SETUP:**Tools and Special Tools**

Multimeter (WP 0177, Table 2, Item 2)
Safety glasses

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

None Required

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

TEST

Using a multimeter, make continuity measurement. See Table 3.

Table 3. MODE SELECT Switch Test.

	FROM (Terminal #)	TO (Terminal #)	METER READING
Fan	7	8	2 Ω or less
Low Heat (12.5 KW)	3	4	2 Ω or less
	7	8	2 Ω or less
High Heat (25 KW)	1	2	2 Ω or less
	3	4	2 Ω or less
	7	8	2 Ω or less
Cool	5	6	2 Ω or less
	7	8	2 Ω or less
	11	12	2 Ω or less

END OF TASK

THERMOSTAT – TEST

INITIAL SETUP:**Tools and Special Tools**

Safety glasses

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

None Required

References

WP 0005, Fold Out Pages

Equipment ConditionECU Connected and powered up

NOTE

Refer to Fold Out pages for the ECU.

TEST - COOL MODE

Verify that ECU power cable is connected to appropriate power source and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

1. Ensure that return duct baffle is closed.
2. Set thermostat to 100°F.
3. Set MODE SELECT switch on ECU Control Panel to COOL.
4. Listen for audible whistle from Hot Gas By-pass Valve.
5. Slowly turn thermostat temperature down.
6. Once thermostat falls below ambient temperature, the Hot Gas By-pass Valve should close and whistling will cease indicating an operational thermostat.
7. If thermostat does not pass test replace.

END OF TASK**TEST - HEAT MODE**

1. Ensure that return duct baffle is closed.
2. Set thermostat to 40°F.

NOTE

If heater contacts do not pull-in, verify that thermostat is bad by testing heater contactors.

3. Slowly raise thermostat temperature. When thermostat temperature reaches ambient temperature, observe heater contacts operating.
4. If thermostat does not pass test replace.

END OF TASK

CIRCUIT BREAKERS – TEST

INITIAL SETUP:**Tools and Special Tools**

Multimeter (WP 0177, Table 2, Item 2)
Safety glasses

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

WP 0005, Fold Out Pages

Equipment Condition

ECU Connected and powered up

NOTE

Refer to Fold Out pages for the ECU.

TEST

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Circuit Breaker on electric power source is shut down and that power cable has been disconnected from electric power source.
2. Open ECU control panel door.
3. Set multimeter to read resistance.

WARNING

Prior to performing the following test, ensure that all power to ECU has been disconnected. Failure to comply with this warning could result in electrical shock or death to the individual and/or damage to the equipment.

4. Place Circuit breaker under test in the OFF position.
5. Place meter probes across associated terminals of circuit breaker and measure resistance. Multimeter should read open (infinite). If a readable resistance is measured, circuit breaker is bad, replace.
6. Place Circuit breaker in the ON position.
7. Place meter probes across associated terminals of circuit breaker and measure resistance. Multimeter should read short (0 Ω). If any resistance is measured circuit breaker is bad, replace.

END OF TASK

COMPRESSOR MOTOR STARTER PROTECTOR (CMSP) DC VOLTAGE – TEST

Tools and Special Tools

Multimeter (WP 0177, Table 2, Item 2)
Safety glasses

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

WP 0005, Fold Out Pages

Equipment Condition

ECU Connected and powered up

NOTE

Refer to Fold Out Pages for the ECU.

STATIC

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), circuit breaker on power source is shut down and that power cable has been disconnected from electric power source.
2. Open ECU control panel door.
3. Set multimeter to read resistance.
4. Place meter probes across associated terminals of CMSP and activate CMSP by pushing in on actuator. Multimeter should read a short (0 Ω). If any resistance is measured across CMSP, CMSP is bad, replace.

END OF TASK**ACTIVE**

1. Verify that ECU power cable is connected to electric power source and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Set MODE SELECT switch to COOL.
3. Set thermostat to 40°F.
4. Observe CMSP pulling in. If CMSP does not pull in, use multimeter to measure between wire # 1606 and # 1413 on CMSP for 24 VAC.
5. If 24 VAC is present, replace CMSP.

NOTE

Compressor is on a 24 second time delay.

6. If 24 VAC is not present, troubleshoot time delay.

END OF TASK

LOW HEATER (LHT) CONTACTOR or HIGH HEATER CONTACTOR (HHT) – TEST**Tools and Special Tools**

Multimeter (WP 0177, Table 2, Item 2)
Safety glasses

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

WP 0005, Fold Out Pages

Equipment Condition

ECU Connected and powered up

NOTE

Refer to Fold Out Pages for the ECU.

TEST (STATIC)

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), circuit breaker on power source is shut down and that power cable has been disconnected from electric power source.
2. Open ECU control panel door.
3. Set multimeter to read resistance.
4. Place meter probes across associated terminals of LHT or HHT contactor and activate contactor by pushing in on actuator. Multimeter should read a short (0 Ω). If any resistance is measured across contactor, contactor is bad, replace.

END OF TASK**TEST (ACTIVE)**

1. Verify that ECU power cable is connected to electric power source and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Set MODE SELECT switch to position in Table 4.
3. Set thermostat to 100°F.
4. Observe contactors close/open. If contactor does not close/open, use a multimeter to verify readings in Table 4.

Table 4. Heater Contactor Measurements.

MSS Switch Setting	Contactor	FROM	TO	READING
OFF	LHT	1531	1413	0 VAC
	HHT	1514	1413	0 VAC
LOW HEAT	LHT	1531	1413	24 VAC
	HHT	1514	1413	0 VAC
HIGH HEAT	LHT	1531	1413	24 VAC
	HHT	1514	1413	24 VAC

TEST (ACTIVE) - Continued

5. If reading is correct, replace contactor.
6. If reading is not correct, isolate to thermostat, High Temperature Cutout, or MODE SELECT switch.

END OF TASK

COMPRESSOR MOTOR STARTER PROTECTOR (CMSP) or EVAPORATOR MOTOR STARTER PROTECTOR (EMSP) AC VOLTAGE – TEST

Tools and Special Tools

Multimeter (WP 0177, Table 2, Item 2)
Safety glasses

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

WP 0005, Fold Out Pages

Equipment Condition

ECU Connected and powered up

NOTE

Refer to Fold Out pages for the ECU.

TEST

1. Verify that ECU power cable is connected to electric power source and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Verify that CMSP/EMSP are set to OFF.
3. Using multimeter, measure terminals listed in Table 5 for 208 VAC.

Table 5. CMSP/EMSP Voltage Inputs.

Meter connections		Meter reading	CMSP 208 VAC Input Connections		EMSP 208 VAC Input Connections	
From	To		Terminal	Wire	Terminal	Wire
L1	L2	208 VAC	L1	1071	L1	1071
L2	L3	208 VAC	L2	1081	L2	1081
L3	L1	208 VAC	L3	1091	L3	1091

4. If 208 VAC is not present, troubleshoot input power to ECU.
5. If 208 VAC is present, energize CMSP/EMSP and measure across terminals listed in Table 6 for 208 VAC.

Table 6. CMSP/EMSP Voltage Outputs.

Meter connections		Meter reading	CMSP 208 VAC Input Connections		EMSP 208 VAC Input Connections	
From	To		Terminal	Wire	Terminal	Wire
T1	T2	208 VAC	T1	1121	T1	1072
T2	T3	208 VAC	T2	1131	T2	1082
T3	T1	208 VAC	T3	1141	T3	1092

6. If 208 VAC is not present, replace CMSP/EMSP.

TEST - Continued

7. Measure across terminals listed in Table 7 for 24 volts.

Table 7. CMSP/EMSP 24 Volt Outputs.

Item	Terminal/ (Wire marker)		Meter reading
	From	To	
CMSP AUX	1651	1652	24 VDC
CMSP	A1 (1571)	A2 (1413)	24 VAC
EMSP	A1 (1472)	A2 (1413)	24 VAC

8. If voltage is not present, replace CMSP/EMSP/CMSP AUX component.

END OF TASK

BRIDGE RECTIFIER– TEST

INITIAL SETUP:**Tools and Special Tools**

Multimeter (WP 0177, Table 2, Item 2)
Safety glasses

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

WP 0005, Fold Out Pages

Equipment Condition

ECU Connected and powered up

NOTE

Refer to Fold Out pages for the ECU.

TEST

1. Verify that ECU power cable is connected to electric power source and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.
2. Place MODE SELECT switch into HEAT mode, and AUXILIARY HEAT switch into MANUAL and operate auxiliary heater.
3. Using multimeter, measure across terminals 33 and 32A bridge rectifier for 24 VAC.
4. If 24 VAC not present, all connections are correct and check transformer for 24 VAC as described above.
5. If 24 VAC present, set multimeter to measure DC and measure across terminals 57 and 58 of bridge rectifier for 24 VDC.
6. If 24 VDC not present, at 57 and 58 of bridge rectifier, replace bridge rectifier.

END OF TASK

TRANSFORMER– TEST

INITIAL SETUP:**Tools and Special Tools**

Multimeter (WP 0177, Table 2, Item 2)

Safety glasses

Personnel Required

Utilities Equipment Repairer, MOS

91C (1)

Materials/Parts

None Required

References

WP 0005, Fold Out Pages

Equipment ConditionECU Connected and powered up

NOTE

Refer to Fold Out Pages for the ECU.

TEST

1. Verify that ECU power cable is connected to electric power source and start ECU in accordance with ECU Start Procedure (WP 0005).
2. Using multimeter, measure across terminals H1 and H2 of transformer for 208 VAC.
3. If 208 VAC present, measure across terminals X1 and X2 of transformer for 24 VAC.
4. If 208 VAC not present, verify that all connections are correct and input circuit breaker is energized.
5. If 24 VAC is not present at X1 and X2 of transformer, replace transformer.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
ECU (HEATING & COOLING) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0177, Table 2, Item 1)
Multimeter (WP 0177, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the Environmental Control Unit (ECU) by Maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the ECU. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

WARNING

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the ECU. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Table 1. Maintainer Troubleshooting ECU – Heating & Cooling.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Conditioned air too warm (in Cool mode)	ECU Circuit breaker tripped	Disconnect power source from ECU (WP 0005). Open ECU control panel. Inspect circuit breaker(s) (Figure 1 of WP 0045). If tripped, reset and test system. If circuit breaker(s) (Figure 1 of WP 0045) trip again, replace.
		Blower motor bad/inoperative	Fan belt damaged/out of adjustment. Shut down ECU and inspect blower motor and belt for operation. If necessary, adjust fan belt. If blower motor is still inoperative, replace.
		Condenser fan bad/inoperative	Shut down ECU and inspect condenser fan for operation. Remove any debris that may impede operation. If condenser fan is still inoperative, replace. Inspect evaporator coil. If necessary, clean.
		Evaporator coil dirty	Inspect condenser grill and coil. If necessary, remove condenser grill and clean coils.
		Condenser coil fins blocked with debris	Shut down ECU and check high pressure switch. If necessary, reset switch and attempt to restart ECU. If high pressure switch trips again, replace.
		High pressure switch tripped	

Table 1. Maintainer Troubleshooting ECU – Heating & Cooling - Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
2	Conditioned air too cold (in Heat mode)	Filters clogged/damaged	Inspect filter(s) if necessary clean/replace.
		Blower motor bad/inoperative	Fan belt damaged/out of adjustment. Shut down ECU and inspect blower motor and belt for operation. If necessary, adjust fan belt. If blower motor is still inoperative, replace.
3	Blower does not operate	Fan belt damaged/out of adjustment	Shut down ECU and inspect blower motor and belt for operation. If necessary, adjust/replace fan belt. If blower motor is still inoperative, replace.
4	Discharge pressure too high	Condenser fan inoperative	Inspect condenser fan for operation. If necessary, tighten belts. If fan(s) are still inoperative contact Field maintenance.
		Condenser coil fins blocked with debris	Inspect condenser grill and coil. If necessary remove condenser grill and clean coils.
5	Discharge pressure too low		Contact next level of maintenance.
6	Suction pressure too high	Condenser coil fins blocked with debris	Inspect condenser grill and coil. If necessary, remove condenser grill and clean coils.
		Voltage supplied to ECU incorrect (Too high/too low)	Check meters on Genset control panel. If necessary, adjust VOLTAGE ADJUST potentiometer.
			Contact next level of maintenance.
7	Suction pressure too low		Contact next level of maintenance.
8	Compressor fails to start	Compressor overload open	Shut down ECU and allow compressor to reset.

Table 1. Maintainer Troubleshooting ECU – Heating & Cooling - Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
8 (Cont)		TEV/D or HGBV	Perform Superheat Adjustment WP 0051. If adjustment cannot be made replace the TEV/D, HGBV, and compressor in that order.
9	Compressor "short cycles"	Evaporator coil dirty	Inspect evaporator coil. If necessary, clean coils.
		Evaporator coil iced	Inspect evaporator coil. If iced up, shut system down and allow ice to melt.
10	Compressor noisy	Condenser fan inoperative	Inspect condenser fan for operation. If necessary, tighten belts. If fan(s) are still inoperative contact Field maintenance.
		Condenser coil fins blocked with debris	Inspect condenser grill and coil. If necessary, remove condenser grill and clean coils.
		TEV/D or Quench Valve (QV) faulty.	If compressor makes knocking noise check suction line for low temperature indicating that refrigerant is returning to compressor.
		Refrigerant overcharge	Perform Superheat Adjustment WP 0051. If adjustment doesn't correct problem replace QV, TEV/D, or compressor in that order.
		Compressor phase rotation wrong.	Recover and recharge refrigerant (WP 0104). If condition reoccurs, replace compressor (WP 0102). Use schematic to verify wiring is correct for proper compressor rotation.
11	Conditioned air too cold (in Heat mode).	Electrical control circuit or heater element faulty.	Go to ECU electrical troubleshooting WP 0045.

END WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
TRAILER (ELECTRICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0177, Item 1)
Multimeter (WP 0177, Item 2)

References

WP 0130

Personnel Required

Two

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the trailer by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the trailer. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Maintainer Troubleshooting – Trailer (Electrical).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Tail light intermittent	Loose electrical connection	Verify that connections (including ground) are properly connected.
		Bulb(s)	<p>NOTE</p> <p>For incandescent bulb only.</p> <p>Inspect connection at bulb socket for corrosion. Clean and reconnect.</p>
		Inter-vehicular cable intermittent	<p>Inspect entire length of inter-vehicular cable for damage (i.e., cuts, gashes). If damage is present, replace inter-vehicular cable (WP 0130).</p> <p>Inspect connector pins/contacts for corrosion. Clean and reconnect.</p> <p>If necessary, measure continuity of Inter-vehicular cable. If DMM reads greater than 5Ω for any continuity reading, inter-vehicular cable is bad, replace (WP 0130).</p> <p>Contact next level of maintenance.</p>
2	Tail light does not work	Tail light damaged	Inspect tail light assembly for damage. If damaged, replace (WP 0130).
		Loose electrical connection	Verify that connections (including ground) are properly connected.
		Bulb(s)	<p>NOTE</p> <p>For incandescent bulb only.</p> <p>Replace bulb (WP 0117).</p>

Table 1. Maintainer Troubleshooting – Trailer (Electrical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
2 (Cont)	Tail light does not work	Inter-vehicular cable inoperative	Measure continuity of Inter-vehicular cable. If DMM reads greater than 5Ω or for any continuity reading, inter-vehicular cable is bad, replace (WP 0130). Contact next level of maintenance.

END WORK PACKAGE

MAINTAINER TROUBLESHOOTING PROCEDURES
HP-2C/185 UST Trailer
TRAILER (MECHANICAL) TROUBLESHOOTING PROCEDURES

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0177, Item 1)
)

References

WP 0132, WP 0133, WP 0134

Personnel Required

Two

TROUBLESHOOTING PROCEDURES

This work package contains general information for troubleshooting of the trailer by maintainer-level qualified personnel. This work package provides a systematic approach to locating and correcting malfunctions of the trailer. Each section is arranged according to the condition/indication of a problem. The corrective action items have been arranged in order of complexity, with simpler actions listed first. The manual cannot identify all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, contact your supervisor.

WARNING

Special caution must be taken during troubleshooting since protective covers and safety devices may be removed or disabled to gain access and make tests.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Table 1. Maintainer Troubleshooting – Trailer (Mechanical).

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
1	Hand brake does not engage	Damage to hand brake handle/cable	Inspect hand brake handle/cable for damage.
		Hand brake out of adjustment	Adjust hand brake (WP 0133).
		Hand brake cable seized or damaged	Replace damaged hand brake cable (WP 0133).
		Hand brake assembly bent or damaged	Replace damaged hand brake handle/cable (WP 0133).
2	Hand brake does not disengage	Hand brake cable seized or damaged	Replace damaged hand brake cable (WP 0133).
		Hand brake assembly bent or damaged	Replace damaged hand brake handle/cable (WP 0133).
		Parking brake link in wheel assembly bent or damaged	Replace damaged parking brake link (WP 0132).
3	Brake fluid present under trailer	Loose connection	Tighten connection.
		Brake lines kinked or damaged	Replace damaged brake line(s) (WP 0132).
		Damage to master cylinder or brake lines	Inspect master cylinder/brake lines for leaks or loose connections. Replace damaged master cylinder (WP 0132).
		Damage to wheel cylinder	Replace wheel cylinder (WP 0132).
4	Brake actuator does not engage	Damage to brake actuator	Inspect brake actuator for damage. Contact next level of maintenance.
5	Hydraulic brakes exhibit failure	Loose connection	Tighten connection.
		Brake line(s) kinked or damaged	Replace damaged brake line(s) (WP 0132).
		Damage to brake actuator	Replace damaged brake actuator (WP 0133).
		Damage to master cylinder	Replace damaged master cylinder (WP 0132).
		Damage to brakes and/or components.	Replace brakes or brake component (WP 0132).

Table 1. Maintainer Troubleshooting – Trailer (Mechanical) – Continued.

ITEM	CONDITION/INDICATION	POSSIBLE MALFUNCTION	CORRECTIVE ACTION
5 (cont.)	Hydraulic brakes exhibit failure	Lock out pin installed in actuator	Remove pin.
6	Trailer does not track straight when towed or leans to side	Lockout pin in place in actuator	Remove pin.
		Master cylinder fluid low or empty	Add fluid to master cylinder (WP 0132).
		Tire(s) not rotating evenly	Check tire(s) for proper inflation (20 psi – highway; 17 psi off road). Add/remove air as necessary.
		Tire(s) damaged	Inspect tire(s) for uneven/excessive wear. Replace tire (WP 0134).
		One of the hand brakes engaged	Release hand brake.
		Trailer frame or suspension damaged.	Inspect frame/suspension. If damage present contact next level maintenance.
7	Tire(s) will not hold air pressure	Tire unserviceable	Replace tire (WP 0134).
8	Tongue jack assembly will not raise/lower	Tongue jack assembly damaged	Inspect all movable joints and areas for damage. If damaged, replace tongue jack assembly (WP 0124).
9	Trailer stabilizer leg does not raise/lower	Stabilizer leg damaged	Inspect stabilizer leg for damage. If damaged, replace stabilizer leg (WP 0133).
10	Excessive motion of lunette	Shock absorber damaged	Replace shock absorber (WP 0133).

END OF WORK PACKAGE

CHAPTER 6

MAINTAINER MAINTENANCE INSTRUCTIONS

FOR

HP-2C/185 UST Trailer

18kW GENSET, ANALOG

**MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
GENSET PMCS INTRODUCTION**

GENERAL

This work package provides data necessary to keep the Genset operational ready. PMCS are performed to keep the Genset in operational condition. The checks are used to find, correct, and report problems. Maintainer personnel are required to perform the tasks as indicated in Maintainer PMCS (WP 0052), Table 1. PMCS are performed by the Maintainer each time the equipment is operated.

Before you begin operating the Genset, do Before PMCS.

Once a week do Weekly PMCS. If Genset has not been operated in a week, perform Before PMCS.

Do Monthly PMCS once a month. If Genset has not been operated in a month, perform PMCS as outlined in WP 0052.

If operating the Genset for the first time, perform Weekly PMCS the first time, do your Before PMCS.

WARNINGS AND CAUTIONS

Special attention should be paid to the WARNINGS and CAUTIONS appearing in the Maintainer PMCS table. A WARNING means someone could be injured. A CAUTION means equipment could be damaged.

LEAKAGE DEFINITION

It is necessary for you to know how fluid leakage affects the status of the trailer. The following are definitions of the classes of leakage you need to know to be able to determine the status of the trailer. Learn these leakage definitions when in doubt, contact next level of maintenance.

CAUTION

Maintainers must perform appropriate maintenance when Crews report Class III leaks. Failure to comply may result in damage to equipment.

NOTE

Equipment operation is allowable with minor leakages (Class I or II). Consideration must be given to fluid capacity of the item or system being checked. When Maintainer is in doubt, notify next level maintenance.

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.

CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

CLASS III - Leakage of fluid great enough to form drops that fall from the item being checked.

INSPECTION

Look for signs of a problem or trouble. Senses help here. You can feel, smell, hear, or see many problems. Be alert when on the Genset.

Inspect to see if items are in good condition. Are they correctly assembled, stowed, and secured, or excessively worn, leaking, corroded, or improperly lubricated? Correct any problems found or notify the next level of maintenance.

There are some common items to check all over the Genset. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, notify the next level of maintenance.
2. Welds: Many items on the Genset are welded. To check these welds, look for chipped paint, rust corrosion, or gaps. When these conditions exist, Maintainer must notify next level of maintenance.
3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify next level of maintenance.
4. Hoses and fluid lines: Look for wear, damage and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. If any leaks or damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify next level of maintenance.
5. Belts and pulleys. Check belt tension. Look for cracks, excessive wear, and damage. Check pulleys for rust corrosion, or damage. If any damage is found, Maintainer Level Maintenance must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify next level of maintenance.

LUBRICATION SERVICE INTERVALS - NORMAL CONDITIONS

General

For safer, more trouble-free operations, make sure that your Genset is serviced when it needs it. Proper lubrication and maintenance intervals which are the responsibility of the Maintainer level maintenance are found in this work package.

Adherence

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the maintenance prescribed for a particular interval. On condition (OC) oil sample intervals shall be applied. Change the hard time interval if lubricants are contaminated or if operating the equipment under adverse operating conditions, included longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals must be applied during the warranty period.

Cleaning Fittings Before Lubrication**WARNING**

Cleaning solvents may be toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using cleaning solvent. Failure to comply may result in serious injury or death to personnel.

If personnel become dizzy while using cleaning solvents, immediately get fresh air and medical help. If cleaning solvent contacts skin or clothes, flush with cold water. If cleaning solvent contacts eyes, immediately flush eyes with water and get medical attention. Failure to comply may result in serious injury or death to personnel.

Lubrication After Fording

If a fording operation occurs, lubricate all fittings below fording depth and check submerged gear boxes for presence of water.

Lubrication After High Pressure Washing

After a thorough washing, lubricate all grease fittings and oil can points outside and underneath trailer.

Hard Time Lubrication Intervals

For equipment under manufacturer's warranty, hard time lubrication intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g. longer than usual operating hours, extended idling periods, extreme dust).

EXPLANATION OF TABLE ENTRIES

Item Number - Numbers in this column are for reference. When completing DA Form 2404/DA Form 5988E (Equipment Inspection and Maintenance Worksheet), include the item number for the check/ maintenance indicating a fault. Item numbers appear in the order in which the checks/ maintenance are performed for the interval listed.

Interval - This column indicates when a procedure must be performed (i.e., Before, During, or After an operation).

Item to Be Checked or Serviced - This column provides the item that is to be checked or Serviced.

Procedure - This column describes the procedure that must be followed to ensure that the equipment is capable of performing its intended mission.

Equipment Not Ready/Available If - This column lists conditions that make the Genset not fully mission capable. If the problem can be fixed using the troubleshooting procedures and/or maintenance procedures in this manual, do so. If not, document the items not able to be fixed on DA Form 2404/DA Form 5988E for Maintainer maintenance. For further information on how to use this form, see DA PAM 750-8. Be sure to observe and annotate all special circumstances that appear/occur.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
PMCS (GENSET)

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (2)**Materials/Parts**

NA

References

WP 0005, WP 0054-0094

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

Table 1. Maintainer Preventive Maintenance Checks and Services - Genset.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1	Weekly	GENSET	<p style="text-align: center;">NOTE</p> <p>Refer to WP 0042 through WP 0082 for Genset maintenance procedures.</p> <p style="text-align: center;">WARNING</p> <p>Ensure radiator is fully cooled. Hot coolant could erupt into operator's face and cause severe injury.</p> <p>1. Check radiator associated hoses and clamps for any type of damage or deterioration. Ensure that hoses are not collapsed, swollen, excessively soft or spongy. Ensure that no damage or corrosion is present to associated clamps. Replace hoses and clamps as necessary.</p> <p>2. Check water pump for cracks, leaks, or other damage. Replace if necessary.</p>	<p>Damage to radiator and associated hoses (to include cuts, tears, holes and leaks) or associated clamps present.</p> <p>Damage to water pump present.</p>

Table 1. Maintainer Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1 (cont)	1 st 50 Hours		<p>3. Check battery, cables, battery fuse and warmer. Ensure that all are securely fastened. Ensure that no physical damage, (i.e., cracks) is present to battery, cables, associated terminals, battery fuse, and warmer. Ensure that electrical connections are correct. Ensure that all are clean and free of excessive dirt, grease and grime. Replace battery, cables, battery fuse or warmer as necessary.</p> <p>4. Check muffler, spark arrestor and exhaust pipes for excessive corrosion, dents, dings, holes, leaks. Replace as necessary.</p> <p>5. Check Genset Control Panel fuses.</p> <p>Change oil and filter.</p> <p>1. Check fluid levels. Verify that fluids (i.e., oils, coolants) are at their proper levels, no discoloration or indication of burning/overheating is present.</p> <p>2. Check all belts and associated pulleys. Belts should not show any signs of excessive wear, cracking or other damage. Check belts for proper tension. Pulleys should not contain any deformities or other signs of physical damage. Replace/adjust belts as necessary.</p>	<p>Electrical connections are not correct. Battery fuse bad. Damage to battery, cables, terminals or warmer present.</p> <p>Physical damage or excessive corrosion present. Parts missing.</p> <p>Fuse blown</p> <p>Low fluid, discolored fluids.</p> <p>Damage or excessive wear to belts and associated pulleys present. Belt tension not adjusted properly.</p>

Table 1. Maintainer Preventive Maintenance Checks and Services – Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
	125 Hours		1. Check fuel filter. If excessively dirty or discolored, change.	Fuel filter excessively dirty or discolored.
			2. Check and clean air filter. If beyond cleaning replace. If operating in a hot climate change air filter.	Air filter excessively dirty.
	250 Hours		Check tightness of CB terminal screws. Torque to 45 in-lbs.	Cannot tighten, or terminal screw damaged.
	250 Hours		1. Change oil and filter.	Oil and filter has not been changed.
			2. Clean air filter.	
	500 Hours		1. Perform overall inspection of HP-2C/185 UST Trailer. Check all components for damage. Check for completeness.	Missing/incomplete hardware causing improper operation of system.
			2. Perform 250 hour PMCS.	
			3. Change fuel and air filter.	
	1,000 Hours		1. Check all external fittings for leaks and completeness.	Fittings leak or inoperative.
			2. Perform 500 hour PMCS.	
	2,000 Hours		1. De-carbonize engine, if performing poorly, contact next level of maintenance.	Engine does not operate efficiently.
			2. Replace filters and fan belt.	
			3. Change engine coolant.	
			4. Drain and clean fuel tank.	Fuel contaminated

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
MAINTAINER MAINTENANCE INDEX

GENERAL

This section contains an index of repair/removal/replacement or maintenance procedures that may be needed during maintenance or repair of the HP-2C/185 UST Trailer by maintainer personnel. Maintenance is limited to those failures that may be repaired at the Maintainer level. The index identifies the maintenance function, which is followed by a column that identifies the work package and page(s) where maintainer level procedure(s) may be found. The index is provided to assist in the quick location of a procedure. The manual cannot list all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is de-energized before attempting to perform any procedures.

If HP-2C/185 UST Trailer suddenly loses power, ensure all switches are reset before applying alternate power. Sudden surges of power could cause damage to components.

Maintenance Function	Procedure
----------------------	-----------

Genset

- | | | |
|-----|--|------------|
| 1. | Genset access panel maintainer maintenance | WP 0054 |
| | Access panel latch removal/replacement | WP 0054-2 |
| 2. | Genset control panel, bulbs, latches and fuse maintainer maintenance | WP 0055 |
| | Control panel latches removal/replacement | WP 0055-2 |
| | Control panel indicator lights removal/replacement | WP 0055-4 |
| | Fuse test/removal/replacement | WP 0055-6 |
| 3. | Genset battery, battery fuse, support bracket, warmer maintenance | WP 0056 |
| | Battery fuse removal/replacement | WP 0056-2 |
| | Battery, retainer and mounting bracket removal/replacement | WP 0056-4 |
| | Battery warmer removal/replacement | WP 0056-9 |
| 4. | Genset oil and oil filter maintainer maintenance | WP 0057 |
| | Oil and oil filter removal/replacement | WP 0057-2 |
| 5. | Genset air filter maintainer maintenance | WP 0058 |
| | Air intake filter removal/replacement | WP 0058-2 |
| 6. | Genset glow plug and glow plug connector maintainer maintenance | WP 0059 |
| | Glow plug and connector strip removal/inspect/test/replacement | WP 0059-2 |
| 7. | Genset oil pressure switch maintainer maintenance | WP 0060 |
| | Oil pressure switch removal/replacement | WP 0060-2 |
| 8. | Genset oil pressure system maintainer maintenance | WP 0061 |
| | Oil pressure sending unit removal/replacement | WP 0061-2 |
| | Low oil pressure cut-off switch removal/replacement | WP 0061-5 |
| 9. | Genset fuel system maintainer maintenance | WP 0062 |
| | Fuel filter removal/inspect/replacement | WP 0062-2 |
| | Fuel tank maintainer | WP 0062-5 |
| | Fuel gauge removal/replacement | WP 0062-7 |
| | Fuel tank removal/replacement | WP 0062-10 |
| | Fuel hose removal/replacement | WP 0062-15 |
| | Fuel line heater removal/replacement | WP 0062-17 |
| 10. | Genset starter maintainer maintenance | WP 0063 |
| | Starter removal/replacement | WP 0063-2 |

Maintenance Function	Procedure
Genset - continued	
11. Genset diesel speed sensor maintainer maintenance	WP 0064
Diesel speed sensor removal/test/replacement	WP 0064-2
12. Genset electric fuel pump maintainer maintenance	WP 0065
Electric fuel pump removal/replacement	WP 0065-2
13. Genset coolant high temperature cutoff switch maintainer maintenance	WP 0066
Coolant high temperature cutoff switch removal/replacement	WP 0066-2
14. Genset solenoid maintainer maintenance	WP 0067
K2 or K3 solenoid removal/replacement	WP 0067-2
K4 solenoid removal/replacement	WP 0067-5
K4 solenoid circuit breaker removal/replacement	WP 0067-8
15. Genset coolant temperature sensor maintainer maintenance	WP 0068
Coolant temperature sensor removal/replacement	WP 0068-2
Thermostat removal/replacement	WP 0068-5
16. Genset engine coolant maintainer maintenance	WP 0069
Engine coolant removal/replacement	WP 0069-2
Engine coolant reservoir bottle removal/replacement	WP 0069-5
17. Genset radiator maintainer maintenance	WP 0070
Radiator, hoses, and clamps removal/replacement	WP 0070-2
18. Genset alternator maintainer maintenance	WP 0071
Alternator removal/replacement	WP 0071-2
19. Genset fan belt maintainer maintenance	WP 0072
Fan belt inspection/adjustment/removal/replacement	WP 0072-2
20. Genset fan maintainer maintenance	WP 0073
Fan removal/replacement	WP 0073-2
21. Genset water pump maintainer maintenance	WP 0074
Water pump removal/replacement	WP 0074-2
22. Genset exhaust system maintainer maintenance	WP 0075
Exhaust flex pipe, elbow and muffler removal/replacement	WP 0075-2
Exhaust manifold and gasket removal/replacement	WP 0075-8
23. Genset fuel valve maintainer maintenance	WP 0076
Fuel selector switch removal/replacement	WP 0076-2
Auxiliary fuel port removal/replacement	WP 0076-5
24. Genset fuel injection system maintainer maintenance	WP 0077
Fuel injector removal/clean/replacement	WP 0077-2
Fuel injector pump removal/replacement	WP 0077-6
Fuel injection system lines removal/replacement	WP 0077-10
Prime fuel system	WP 0077-16

Maintenance Function	Procedure
Genset - continued	
25. Genset engine heater (hydronic) maintainer maintenance	WP 0078
Engine heater (hydronic) removal/replacement.....	WP 0078-2
Engine heater (hydronic) fuel pump and fuel filter removal/replacement.....	WP 0078-6
Engine heater (hydronic) fuel filter removal/replacement	WP 0078-8
Engine heater (hydronic) hose removal/replacement.....	WP 0078-11
Engine heater (hydronic) fuse removal/replacement.....	WP 0078-19
26. Genset (engine-generator) removal/replace.....	WP 0079
Genset Removal/Replacement.....	WP 0079-2
Engine/Generator Removal/Replacement.....	WP 0079-7
Electrical Connections to Engine/Generator Removal/Replacement	WP 0079-9
Oil and Fuel Preparation for Engine/Generator Removal/Replacement.....	WP 0079-12
Radiator and Exhaust Manifold Connections Removal/Replacement	WP 0079-14
Heater and Battery Warming Plate Connections Removal/Replacement	WP 0079-16
EGA Removal/Replacement	WP 0079-18
Separating Engine Generator Assembly.....	WP 0079-26
27. Torque Values	WP 0175
Bolt Diameter and Thread Pitch	WP 0175-1
Flanged Head Bolt Torque Specifications.....	WP 0175-3
Standard Bolt Torque Specifications.....	WP 0175-3
28. Genset-AC Meters	WP 0083
Meter adjustment/removal/replacement.....	WP 0083-2
29. Genset-Meters & Gauges	WP 0083
Meter/Gauge removal/test/replacement.....	WP 0083-2
30. Genset-Switches & Potentiometer.....	WP 0082
Voltage adjust potentiometer test/removal/replacement	WP 0082-2
Rotary switches removal/replacement	WP 0082-5
Toggle switches removal/replacement.....	WP 0082-9
31. Genset-Panel Lights	WP 0082
Panel lights removal/replacement.....	WP 0082-2
Indicator lights removal/replacement	WP 0082
32. Genset-CB Panel Switches	WP 0082
Battery switch removal/replacement.....	WP 0082-2
Emergency stop switch removal replacement	WP 0082-5
33. Genset-Control Panel Wiring Harness	WP 0084
Control panel wiring harness removal/replacement.....	WP 0084-2
34. Genset-PDP Connectors	WP 0086
Power distribution panel lights removal/replacement	WP 0086-2
Connector (J1 & J4) removal/replacement	WP 0086-5
Connector (J2 & J3) removal/replacement	WP 0086-9
Connector (J5) removal/replacement.....	WP 0086-12
Connector (J6) removal/replacement.....	WP 0086-15

Maintenance Function	Procedure
Genset - continued	
35. Genset Barrier panel Transducer	WP 0087
Transducer removal/replacement	WP 0087-2
36. Genset Barrier panel Current Transformer.....	WP 0088
Current Transformer removal/replacement.....	WP 0088-2
37. Genset Barrier Panel Relays	WP 0089
Relays (K4,K5,K6,K7) removal/replacement	WP 0089-2
38. Genset-Barrier Panel Time Delay.....	WP 0092
Time Delay removal/replacement	WP 0092-2
39. Genset Barrier Panel Voltage Regulator	WP 0090
Voltage Regulator removal/replacement/adjustment.....	WP 0090-2
40. Genset-Barrier Panel Speed Sensor	WP 0093
Speed Sensor removal/replacement.....	WP 0093-2
41. Genset-Barrier Panel Precision Governor	WP 0091
Precision Governor removal/replacement/adjustment.....	WP 0091-2
Genset Barrier Panel Circuit Breakers	WP 0085
Circuit Breaker removal/replacement.....	WP 0085-2
42. Genset Barrier Panel Battery Charger.....	WP 0094
Battery Charger test/Removal/replacement.....	WP 0094-2

END OF WORK PACKAGE

**MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
GENSET ACCESS PANEL LATCH MAINTAINER MAINTENANCE**

GENERAL

This work package provides information on the replacement of the Genset Access Panel Latch.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

ACCESS PANEL LATCH - REPLACE

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

Latch

References

WP 0005

Equipment ConditionGenset shut down

NOTE

The following procedure is typical for all Genset Access Panel Latches.

When attempting to perform the following step, if panel will not open, DO NOT force the Access Panel. If necessary, attempt to gain access to the damaged panel through the Genset. If this is necessary, make sure Genset is not in an operational status

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to front and rear Access Panels of Genset.
3. Remove the Genset Access Panel (Figure 1, Item 4) with the broken latch (Figure 1, Item 1).
4. Remove and retain screw (Figure 1, Item 6), inner tooth washer (Figure 1, Item 8), and back plate (Figure 1, Item 5) from rear of the latch (Figure 1, Item 1). Discard inner tooth washer (Figure 1, Item 8).
5. Remove latch (Figure 1, Item 1) from Access Panel (Figure 1, Item 4).

END OF TASK**REPLACEMENT**

1. Insert new latch (Figure 1, Item 1) into Access Panel (Figure 1, Item 4).
2. Secure latch (Figure 1, Item 1) to Access Panel (Figure 1, Item 4) using screw (Figure 1, Item 6), new inner tooth washer (Figure 1, Item 8), and back plate (Figure 1, Item 5).
3. If necessary adjust lever (Figure 1, Item 7) and stop nuts (Figure 1, Items 2 and 3) to proper level so latch (Figure 1, Item 1) operates properly.
4. Reattach the repaired Genset Access Panel (Figure 1, Item 4).
5. Replace cargo restraints (not shown) to front or rear of Genset.

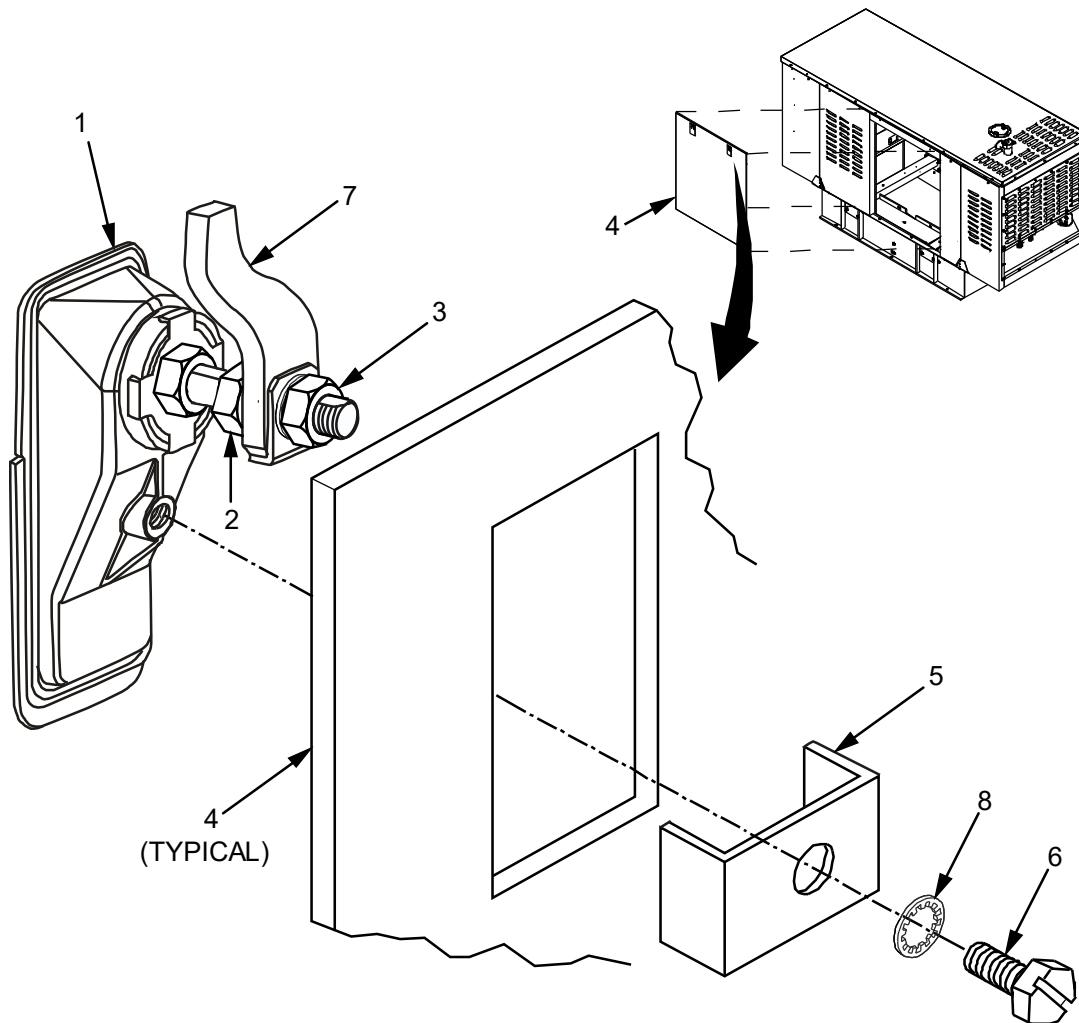


Figure 1. Genset Access Panel Latches - Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET CONTROL PANEL LATCH MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal/replacement of sub-assemblies for the Genset. They consist of:

- Control panel latches removal/replacement.
- Control panel indicator lights removal/replacement.
- Fuse removal/replacement.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock

CAUTION

Never attempt to connect or disconnect cables with Genset in a operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

GENSET – CONTROL PANEL LATCH REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

Latches

References

WP 0005

Equipment ConditionGenset Shut Down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Undo control panel latches and open.
3. Remove lock nut (Figure 1, Item 8), spacer (Figure 1, Item 7), latch (Figure 1, Item 6), lock washer (Figure 1, Item 5), nut (Figure 1, Item 4), retainer nut (Figure 1, Item 3), flat washer (Figure 1, Item 2), and latch handle (Figure 1, Item 9) from control panel (Figure 1, Item 1) and discard.

END OF TASK**REPLACEMENT**

1. Insert new latch handle (Figure 1, Item 9) into opening in control panel (Figure 1, Item 1).
2. Secure latch handle (Figure 1, Item 9) with flat washer (Figure 1, Item 2) and retainer nut (Figure 1, Item 3). Tighten retainer nut (Figure 1, Item 3).
3. Attach nut (Figure 1, Item 4), lock washer (Figure 1, Item 5), latch (Figure 1, Item 6), spacer (Figure 1, Item 7) and lock nut (Figure 1, Item 8). Tighten assembly.
4. Close control panel (Figure 1, Item 1).
5. Start Genset in accordance with Genset Start Procedure (WP 0005).

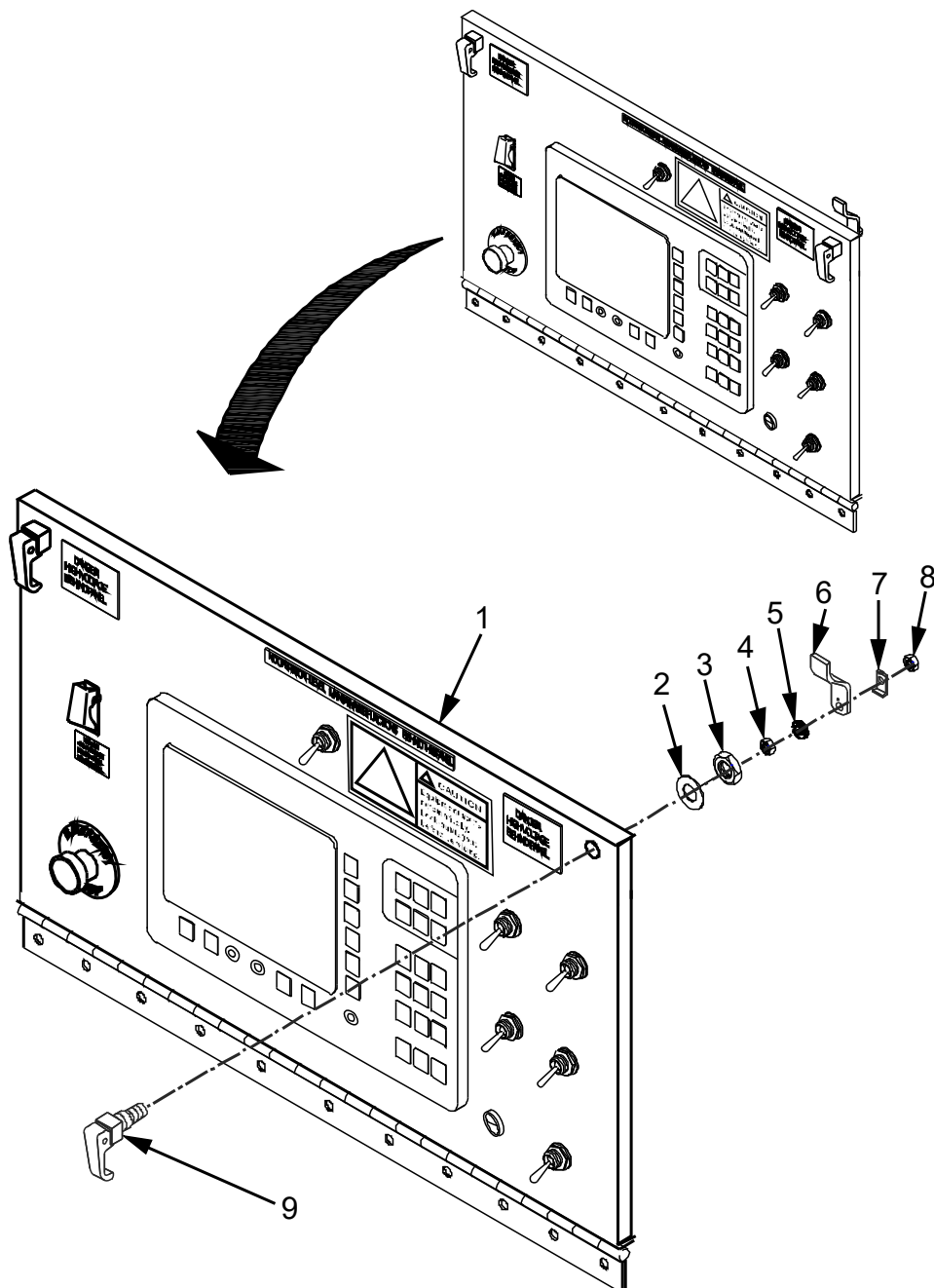


Figure 1. Control Panel Latch Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BATTERY, BATTERY FUSE, SUPPORT BRACKET, AND WARMER MAINTAINER
MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset battery sub-assemblies. They consist of:

- Battery fuse - replace
- Battery, retainer, and bracket - replace
- Battery warmer - replace

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

WARNING

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

CAUTION

Never attempt to connect or disconnect cables with Genset in a operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

BATTERY FUSE - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Battery Fuse
Strap Ties (2) (WP 0180, Table 1, Item 43)**References**

WP 0004, WP 0005

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

Never lay tools in or around battery area. Metal tools could cause batteries to short and cause damage to batteries, electrical parts of engine or injury to personnel.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to access panel (Figure 1, Item 9) of Genset (Figure 1, Item 10).
3. Remove access panel (Figure 1, Item 9) of Genset (Figure 1, Item 10) and set aside.
4. Cut strap ties.
5. Pull back rubber post covers
6. Loosen but do not remove two nuts that secure cable clamps (Figure 1, Item 6) to battery post (Figure 1, Item 8).

REMOVAL - Continued

7. Remove two battery cables (Figure 1, Item 1) with fuse (Figure 1, Item 2) and fuse holder (Figure 1, Item 7) attached.
8. Slide insulator covers (Figure 1, Item 5) back to expose nuts (Figure 1 Item 4).
9. Remove and retain two nuts (Figure 1, Item 4), lock washers (Figure 1, Item 3), and flat washer (Figure 1, Item 11) that secure the fuse (Figure 1, Item 2) to the fuse holder (Figure 1, Item 7). Discard lock washers (Figure 1, Item 3).
10. Remove and discard battery fuse (Figure 1, Item 2).

END OF TASK**REPLACEMENT**

1. Install new battery fuse (Figure 1, Item 2) onto fuse holder (Figure 1, Item 7).
2. Secure by installing battery cables (Figure 1, Item 1), flat washers (Figure 1, Item 11), new lock washers (Figure 1 Item 3) and nuts (Figure 1, Item 4). Tighten nuts.
3. Secure two battery cables with fuse to battery negative cable (Figure 1, Item 12), with two cable ties.
4. Install battery cables (Figure 1, Item 1) to battery terminals (Figure 1, Item 8), and tighten nuts.
5. Install and secure access panel (Figure 1, Item 9).
6. Install cargo restraints (not shown).
7. Start Genset in accordance with WP 0005, Genset Start Procedure.

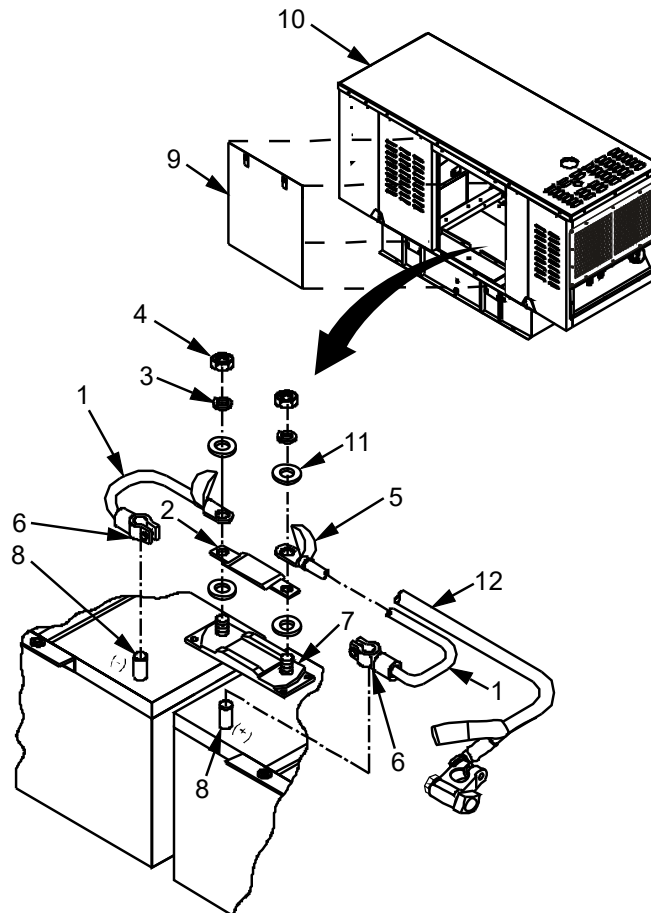


Figure 1. Battery Fuse - Replace.

END OF TASK

BATTERY, RETAINER AND MOUNTING BRACKET - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Battery
Battery mounting bracket
Battery retainer
Strap Ties (2) (WP 0180, Table 1, Item 43)**References**

WP 0005

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High DC voltage, (24 VDC) (12 VDC per battery), and amperage present at electrical connections. Do not enter Genset when operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Never lay tools in or around battery area. Metal tools could cause batteries to short and cause damage to batteries, electrical parts of engine, or injury to personnel.

In event of a battery venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with acid resistant rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

RETAINER**REMOVAL**

1. Verify that Genset (Figure 2, Item 1) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove rear access panel (Figure 2, Item 2) of Genset (Figure 2, Item 1) and set aside.
4. Cut two strap ties.
5. Remove two battery cables (Figure 2, Items 7 & 11) with fuse (Figure 2, Item 9) and fuse holder (Figure 2, Item 10) attached.
6. Remove battery retainers (Figure 2, Item 6) from batteries (Figure 2, Items 13 and 21) by removing two lock nuts (Figure 2, Item 19) and flat washers (Figure 2, Item 20) from battery retainer bolts (Figure 2, Item 3). Discard lock nuts (Figure 2, Item 19).

REMOVAL - Continued**NOTE**

Cable clamp (Figure 2, Item 5) is present at one spot only.

7. Remove and retain cable clamp (Figure 2, Item 5). Lift retainer (Figure 2, Item 6), two retainer bolts (Figure 2, Item 3), and flat washers (Figure 2, Item 4) off of batteries (Figure 2, Items 13 and 21).

END OF TASK**REPLACEMENT**

1. Place battery retainers (Figure 2, Item 6) onto batteries (Figure 2, Items 13 and 21), aligning holes in retainer (Figure 2, Item 6) with holes on mounting bracket (Figure 2, Item 18).
2. Add cable clamp (Figure 2, Item 5) to backside retainer bolt. Insert two retainer bolts (Figure 2, Item 3) and flat washers (Figure 2, Item 4) through retainers. Secure battery retainer bolts using two new lock nuts (Figure 2, Item 19) and flat washers (Figure 2, Item 20).
3. To ensure equal pressure, alternately tighten bolts (Figure 2, Item 3) until battery retainers (Figure 2, Item 6) are secured.
4. Install battery cables (Figure 1, Item 1) and battery fuse holder (Figure 2, Item 10). See Replacement procedure in this WP.
5. Install and secure access door (Figure 2, Item 2).
6. Install cargo restraints (not shown).
7. Start Genset (Figure 2, Item 1) in accordance with WP 0005, Genset Start Procedure.

END OF TASK**BATTERY****REMOVAL****WARNING**

High DC voltage, (24 VDC) (12 VDC per battery), and amperage present at electrical connections. Do not enter Genset when operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

Depleted batteries should be turned in to designated personnel for disposal processing (CDD activation) and disposal in accordance with local regulations or through Defense Reutilization Marketing Office.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

1. Verify that Genset (Figure 2, item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove access panel (Figure 2, Item 2) of Genset (Figure 2, Item 1) and set aside.

REMOVAL - Continued

4. Remove battery fuse (Figure 2, Item 9) and battery fuse holder (Figure 2, Item 10). See Removal procedure described in Battery Fuse removal, Steps 4 - 10 in this WP.
5. Loosen but do not remove nut (Figure 2, Item 12) that secures battery negative cable (Figure 2, Item 26) clamp to negative (-) terminal (Figure 2, Item 24) of battery (Figure 2, Item 13). Disconnect cable clamp from battery terminal (Figure 2, Item 24) and move away from battery.
6. Loosen but do not remove nut (Figure 2, Item 14) that secures red positive battery cables (Figure 2, Items 22 and 23) clamp to positive (+) terminal of battery (Figure 2, Item 25). Disconnect cable clamp from battery terminal (Figure 2, Item 25) and move away from battery.
7. Cut two strap ties (Figure 2, Item 27), remove cable clamp (Figure 2, Item 5) and battery negative cable (Figure 2, Item 26) and move away from battery.
8. Remove two battery retainers (Figure 2, Item 6) and set aside. See Removal procedure described in this WP.
9. Remove batteries (Figure 2, Items 13 and 21) from battery bracket (Figure 2, Item 18) and set aside.

END OF TASK**REPLACEMENT****WARNING**

When installing new battery, be observant of battery polarity (positive and negative terminals). Like polarities should NOT be next to each other. Serious injury to personnel or damage to equipment may occur.

NOTE

Ensure that hardware is present in battery terminals.

1. Set batteries (Figure 2, Items 13 and 21) into battery mounting bracket (Figure 2, Item 18).
2. Place two battery retainer(s) (Figure 2, Item 6) in approximate position over batteries (Figure 2, Items 13 and 21).
3. Install cable clamp (Figure 2, Item 5) and battery negative cable (Figure 2, Item 26), bolt (Figure 2, Item 3), and flat washer (Figure 2, Item 4), through battery retainer (Figure 2, Item 6) and mounting bracket (Figure 2, Item 18).
4. Loosely install remaining bolts (Figure 2, Item 3), flat washers (Figure 2, Item 4) through battery retainers (Figure 2, Item 6) and mounting bracket (Figure 1, Item 18). Secure bolts (Figure 2, Item 3) with four new lock nuts (Figure 2, Item 19) and flat washers (Figure 2, Items 20).
5. Secure battery negative cable (Figure 2, Item 26) with two strap ties (Figure 2, Item 27).
6. To ensure equal pressure, alternately tighten nuts (Figure 2, Item 19) until battery retainers (Figure 2, Item 6) are secure.
7. Install positive battery cables (Figure 2, Items 22 and 23) to positive (+) terminal of battery (Figure 2, Item 25) and tighten nut (Figure 2, Item 14).
8. Install battery fuse holder (Figure 2, Item 10). See Replacement procedure described in this WP.

REPLACEMENT - Continued

9. Install battery negative cable (Figure 2, Item 26) to negative (-) terminal of battery (Figure 2, Item 24) and tighten nut (Figure 2, Item 12).
10. Install and secure access door (Figure 2, Item 2).
11. Install cargo restraints (not shown).
12. Start Genset (Figure 2, Item 1) in accordance with WP 0005, Genset Start Procedure.

END OF TASK**MOUNTING BRACKET****REMOVAL**

1. Remove two batteries (Figure 2, Items 13 and 21). See Removal procedure described in this WP.
2. Remove and retain two bolts (Figure 2, Item 15), lock washers (Figure 2, Item 16), and flat washers (Figure 2, Item 17) that secure battery mounting bracket (Figure 2, Item 18) to Genset (Figure 2, Item 1). Discard lock washers (Figure 2, Item 16),
3. Remove battery mounting bracket (Figure 2, Item 18).

END OF TASK**REPLACEMENT**

1. Install battery mounting bracket (Figure 2, Item 18) into Genset (Figure 2, Item 1) and secure using two bolts (Figure 2, Item 15), new lock washers (Figure 2, Item 16) and flat washers (Figure 2, Item 17).

WARNING

When installing batteries, be observant of battery polarity positive and negative terminals. Like polarities should NOT be next to each other. Serious injury to personnel or damage to equipment may occur.

2. Install two batteries (Figure 2, Items 13 and 21). See replacement procedure described in this WP.
3. Install cargo restraints (not shown).
4. Install and secure access door (Figure 2, Item 2).
5. Start Genset (Figure 2, Item 1) in accordance with WP 0005, Genset Start Procedure.

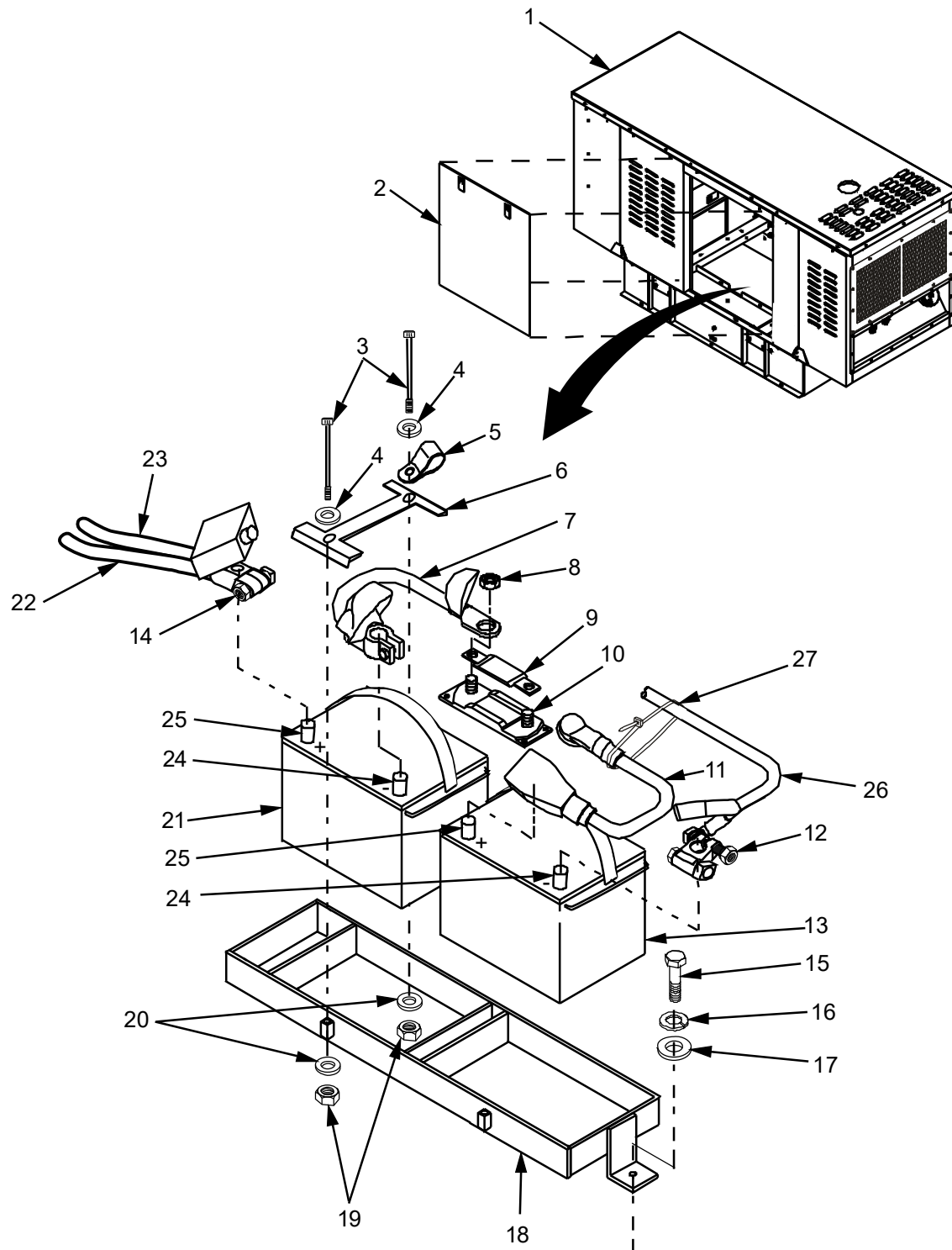


Figure 2. Battery, Retainer and Mounting Bracket - Replace.

END OF TASK

BATTERY WARMER - REPLACE

INITIAL SETUP:**Tools and Special Tools****References**

WP 0005

Materials/Parts**Equipment Condition**Genset shut down
BATTERY SWITCH - OFF**Personnel Required**

Power Generation Equipment Mechanic, MOS 91D (2)

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Battery warmer
Tape, Antisiezing (WP 0180, Table 1, Item 45)
Gloves, Rubber (WP 0180, Table 1, Item 17)**References**

WP 0005

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that the HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel or damage to the HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

REMOVAL

1. Verify that Genset (Figure 3, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shutdown Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 3, Item 2) of Genst.
3. Remove rear access panel (Figure 3, Item 2) of Genset (Figure 3, Item 1) and set aside.

REMOVAL - Continued

4. Disconnect battery ground cable (Figure 2, Item 26) from battery ground terminal as described in this WP.

NOTE

When performing the following step, use two wrenches. One to loosen hose (Figure 3, Item 3) and one to keep associated hardware on battery warmer (Figure 3, Item 4) stationary.

5. Disconnect two hoses (Figure 3, Item 3) (located on underside of Genset) from battery warmer (Figure 3, Item 4) and place into drain bucket.

NOTE

The following step may require two personnel.

6. Remove and retain bolt (Figure 3, Item 5), two flat washers (Figure 3, Items 6 and 7) and lock nut (Figure 3, Item 8) that secure battery warmer (Figure 3, Item 4) to Genset (Figure 3, Item 1). Discard lock nut (Figure 3, Item 8).
7. Remove battery warmer (Figure 3, Item 4).

END OF TASK**REPLACEMENT**

1. Wrap threads on battery warmer (Figure 3, Item 4) with Tape, Antisiezing.

NOTE

The following step may require two personnel.

2. Install battery warmer (Figure 3, Item 4) to underside of Genset (Figure 3, Item 1) and secure with bolt (Figure 3, Item 5), flat washers (Figure 3, Items 6 and 7), and new lock nut (Figure 3, Item 8). Tighten hardware finger tight at this time.

NOTE

When performing the following step, use two wrenches, one to tighten hose (Figure 3, Item 3) and one to keep associated hardware on battery warmer (Figure 3, Item 4) stationary.

3. Connect two hoses (Figure 3, Item 3) (located on underside of Genset) to battery warmer (Figure 3, Item 4).
4. Finish tightening bolt (Figure 3, Item 5), flat washers (Figure 3, Items 6 and 7), and lock nut (Figure 3, Item 8).
5. Connect battery ground cable (Figure 2, Item 26) to battery ground terminal (refer to procedure in this WP).
6. Install and secure rear access panel (Figure 3, Item 2).

REPLACEMENT – Continued

7. Install cargo restraints (not shown).
8. Start Genset (Figure 3, Item 1) in accordance with WP 0005, Genset Start Procedure.

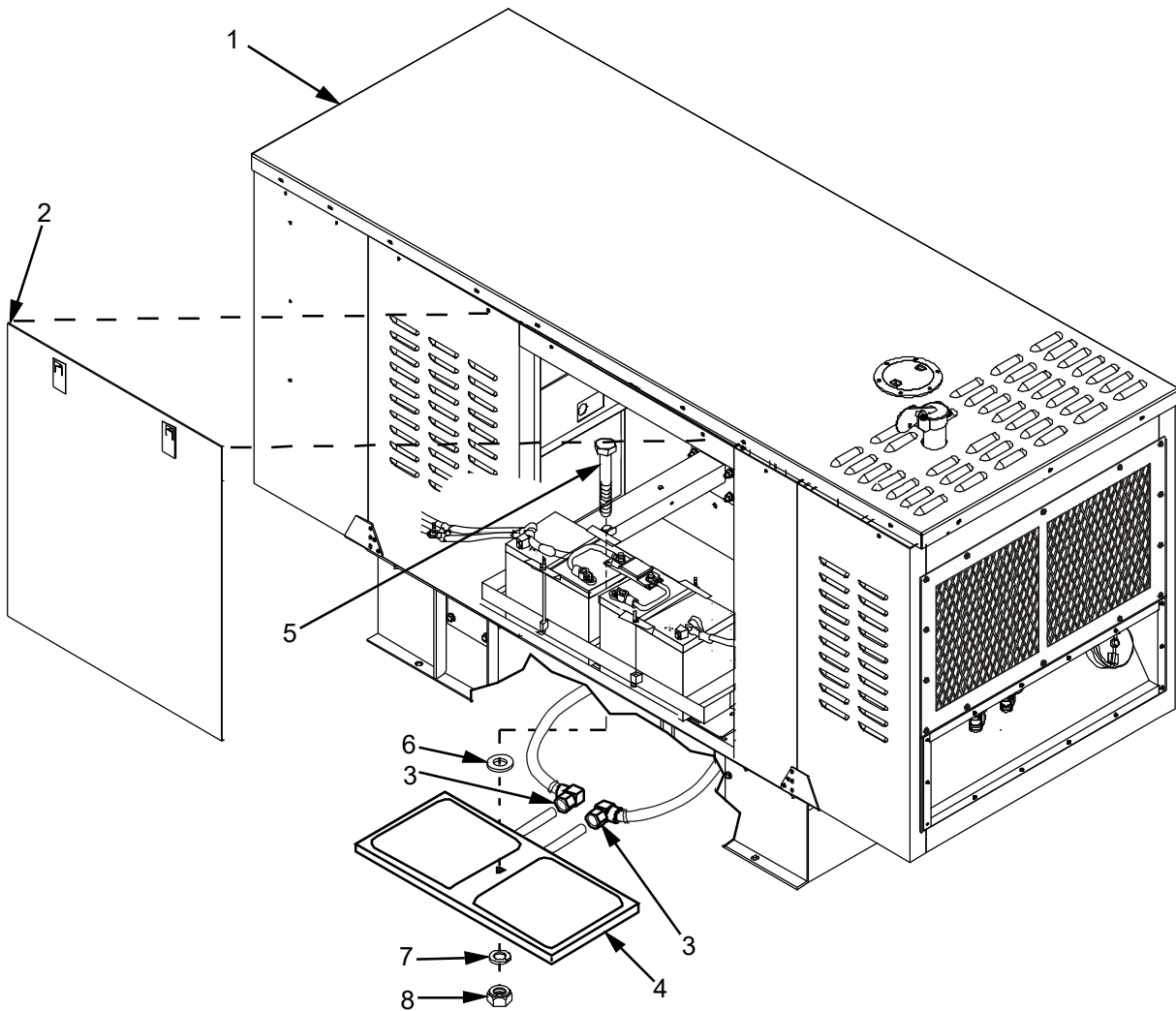


Figure 3. Battery Warmer - Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET OIL AND OIL FILTER MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the service, removal, and replacement of the oil and oil filter for the Genset engine.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

OIL AND OIL FILTER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Drain pan
Oil filter wrench

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Oil filter
Oil (WP 0180, Items 32 or 33)
Cloth, cleaning (WP 0180, Item 14)
Teflon tape (WP 0180, Item 52)
Rubber gloves (WP 0180, Item 19)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

REMOVAL**NOTE**

If needed, run the Genset (Figure 1, Item 1) to bring engine to operating temperature.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 2 and 5) on Genset (Figure 1, Item 1) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in WP 0056).

NOTE

Oil drain plug (Figure 1, Item 7) is located on the front base of the Genset enclosure.

5. Place drain pan under oil drain plug (Figure 1, Item 7). Remove and retain oil drain plug (Figure 1, Item 7).

NOTE

If an oil drain hose is available, insert one end into the engine oil outlet and place opposite end in drain pan. Use of an oil drain hose will reduce spillage.

Collect oil in an appropriate chemical-resistant container for disposal through the local servicing Defense Reutilization and Marketing Office.

6. Open the engine oil drain valve (Figure 1, Item 6) inside the Genset enclosure. Drain oil into drain pan.

REMOVAL - continued**NOTE**

Prior to performing the following step, place absorbent towels under oil filter.

When performing the following step, be observant of all items around the oil filter.

7. Loosen oil filter (Figure 1, Item 3) from oil filter mount (Figure 1, Item 4) with oil filter wrench until finger loose. Finish removing oil filter by hand.
8. Discard oil, oil filter, and any oil soaked rags in accordance with proper HAZMAT procedures.
9. Using a clean lint free cloth clean the oil filter mount.

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following step, inspect oil filter for gasket. Inspect gasket for cuts, nicks or other damage. If gasket is missing or damaged, do not use oil filter.

1. Using clean oil, apply a thin coat of oil to the oil filter seal.

CAUTION

When the following step is being performed, do not force oil filter (Figure 1, Item 3) or cross thread. Failure to observe this caution can result in damage to the engine.

2. Install oil filter (Figure 1, Item 3) onto oil filter mount (Figure 1, Item 4). Tighten until hand tight.

NOTE

When performing the following step, DO NOT over tighten oil filter (Figure 1, Item 3).

3. Tighten oil filter (Figure 1, Item 3) an additional ¼ turn with oil filter wrench.
4. If using a drain hose, remove hose and close oil drain valve (Figure 1, Item 6).
5. Wrap oil drain plug (Figure 1, Item 7) with Teflon tape, install and tighten.
6. Remove and retain oil filler cap.

REPLACEMENT – Continued**NOTE**

When performing the following step, use heavy duty lubricating oil meeting the requirements of MIL-L-2104C/D, AAPICD Series 3. See Table 1 for proper oil viscosity. Refer to WP 0180 (Expendable and Durable Items) for NSN and other information on oil listed in table below.

When performing the following step, DO NOT over fill engine.

7. Add 8.6 quarts (8.13 liters) of oil to engine and allow oil to settle. (app 1 min.)
8. Check engine oil level at dipstick. If necessary, add more oil until dipstick reads between lines.
9. Replace engine oil filler cap.
10. Connect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in WP 0056).
11. Start Genset in accordance with Genset Start Procedure (WP 0005) and allow engine to run for a few minutes to circulate oil through engine.
12. Shut down the Genset in accordance with Genset Stop Procedure (WP 0005) and allow a few minutes for the oil to settle.

NOTE

Engine must be turned off to obtain an accurate reading on the dipstick. The reading on the dipstick should be between the two marks on the dipstick.

13. Check oil level with the dipstick. If oil level is still low, add additional oil. If dipstick indicates proper oil level, re-insert the dipstick verify that oil filler cap is secure.
14. Wipe off any oil that has spilled.
15. Install front and rear access panels (Figure 1, Items 2 and 5).
16. Install cargo restraints (not shown).
17. Start Genset in accordance with Genset Start Procedure (WP 0005).

Table 1. Engine Oil Recommendations.

Ambient Temperature	Mono-grade	Multi-Grade
Below 5°F (–15°C)	5W	5W/20
Between 5°F (–15°C) and 50°F (10°C)	10W	10W/30
Between 40°F (5°C) and 85°F (30°C)	20W	10W/30 or 15W/40
Above 85°F (30°C)	30W	15W/40 or 20W/40

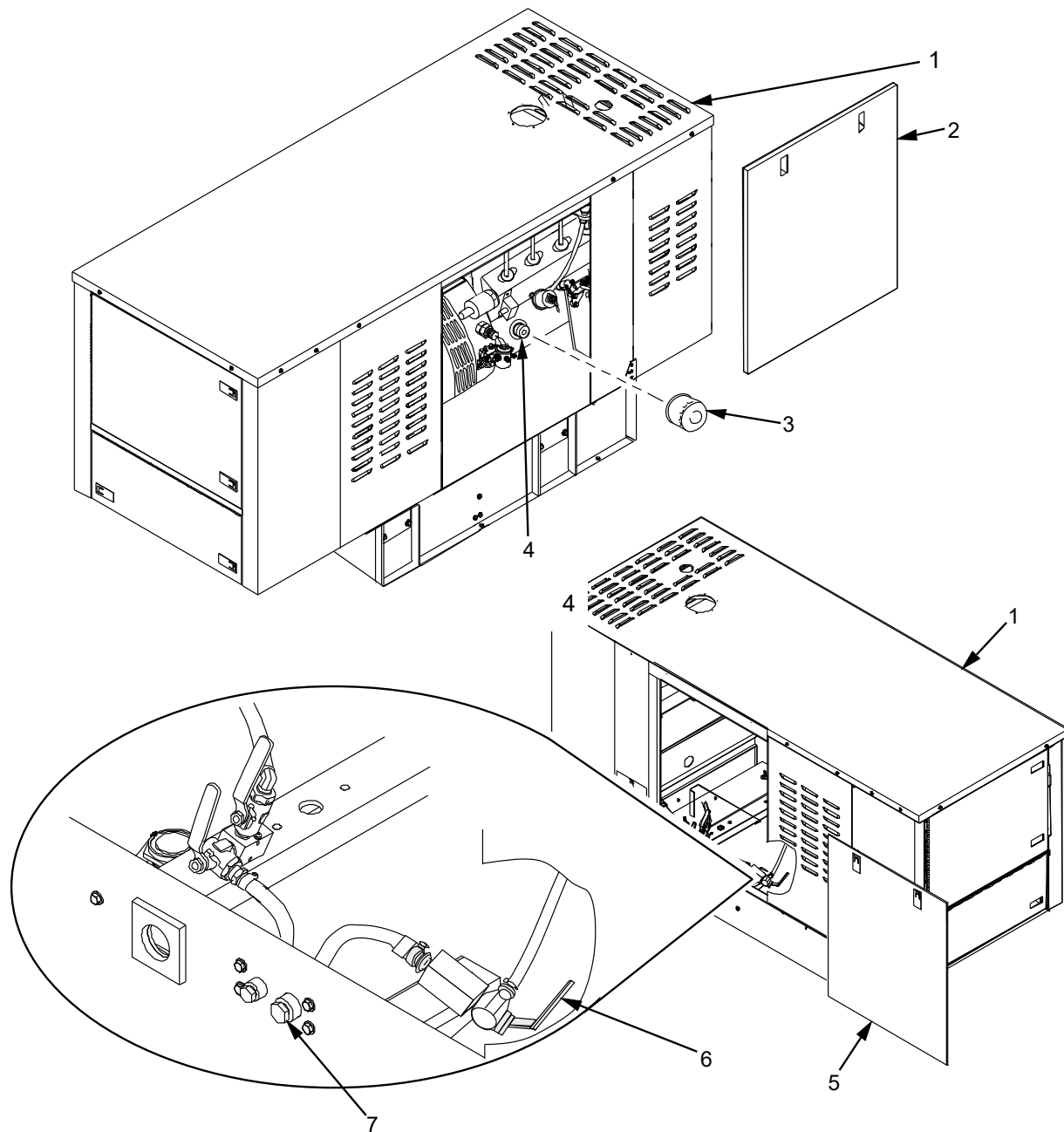


Figure 1. Oil and Filter Removal/Replacement and Oil Drain Plug.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET AIR FILTER MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal/replacement of the Genset air intake filter.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

AIR INTAKE FILTER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

Air filter

References

WP 0005

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 2) of Genset (Figure 1, Item 1).
3. Remove rear access panel (Figure 1, Item 2) of Genset (Figure 1, Item 1) and set aside.
4. Open clasps (Figure 1, Item 3) on engine air intake filter cover (Figure 1, Item 4). Remove air intake filter cover (Figure 1, Item 4) and set aside.
5. Remove air intake filter (Figure 1, Item 5) and properly discard.

END OF TASK**REPLACEMENT**

1. Insert new air intake filter (Figure 1, Item 5).

NOTE

Drain on air intake filter cover (Figure 1, Item 4) should face down.

When air intake filter cover (Figure 1, Item 4) is properly locked into place, cover should not rotate.

2. Replace air intake filter cover (Figure 1, Item 4) and rotate slightly to ensure proper seating.
3. Align clasps (Figure 1, Item 3) on engine air intake filter cover (Figure 1, Item 4) and secure.

REPLACEMENT – Continued

4. Install rear access panel (Figure 1, Item 2) of Genset (Figure 1, Item 1).
5. Install cargo restraints (not shown).
6. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005).

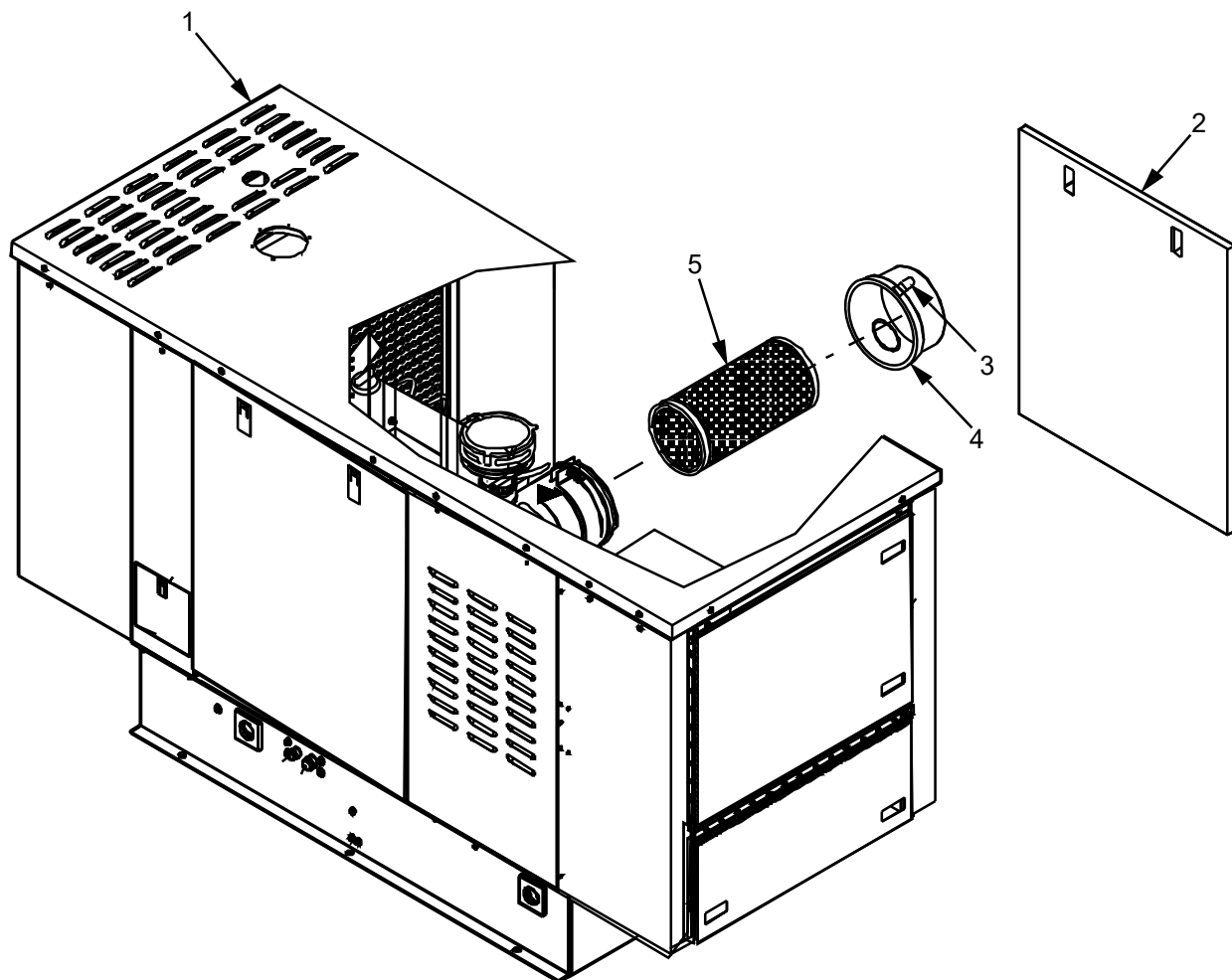


Figure 1. Air Intake Filter Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET GLOW PLUG AND GLOW PLUG CONNECTOR MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the inspection, removal and replacement of the Genset glow plugs and connector strip. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from heat and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

GLOW PLUG AND CONNECTOR STRIP REMOVAL/INSPECT/TEST/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Glow Plug
Connector strip
Anti-seize compound (WP 0180, Item 3)
Cloth, cleaning (WP 0180, Item 14)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 3) of Genset.
3. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in WP 0056).

NOTE

Steps 4 and 5 allow easier access to the glow plugs.

4. Loosen but do not remove nut and bolt that secures exhaust pipe cap (not shown). Remove exhaust pipe cap and set aside.
5. Remove and retain 20 bolts, lock washers, and flat washers (not shown) that secures top access panel (Figure 1, Item 2) to Genset (Figure 1, Item 1). Remove top access panel (Figure 1, Item 2) and set aside.

REMOVAL - Continued**NOTE**

The dip-stick bracket may need to be removed to allow access to glow plug #2.

6. Remove and retain four nuts (Figure 1, Item 5) and washers (Figure 1, Item 6) that secure glow plug connector (Figure 1, Item 8) and terminal lug (Figure 1, Item 7) to glow plugs (Figure 1, Items 4, 9 through 11).
7. Disconnect terminal lug (Figure 1, Item 7) from glow plug #1 (Figure 1, Item 4) and set aside.
8. Remove connector strip (Figure 1, Item 8) from glow plugs and set aside.

NOTE

If glow plugs are to be re-used, identify location and mark glow plug so it may be returned to same spot.

9. Remove four glow plugs.

END OF TASK**INSPECT**

1. Inspect glow plugs for slagging or melting. If either condition is present discard glow plug and replace.
2. Inspect glow plugs for excessive soot. If condition is present, clean glow plug and test.

END OF TASK**TEST**

To measure resistance of glow plug:

- a) Set multimeter to read resistance (X1 scale).
- b) Touch outside threaded ring of the glow plug with black meter lead.
- c) Touch threaded glow plug connector strip stud with red meter lead.

If multimeter reads less than 3Ω or greater than 4Ω replace the glow plug.

END OF TASK

REPLACEMENT

1. Clean off old sealant from all threaded areas.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from heat and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

Do not get anti-seize compound on ends of glow plugs.

2. Apply anti-seize compound to threads of glow plugs (Figure 1, Items 4, 9 through 11).

CAUTION

When the following step is being performed, glow plugs should screw in without resistance. Do not force glow plugs or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

If reusing glow plugs, insert back into the cylinder from which they were removed.

3. Install glow plugs and tighten finger tight.
4. Using torque wrench, tighten glow plugs to 11~14 ft./lb (15~20 n-m/1.5~2.0 kgf-m).

NOTE

Prior to performing the following step, inspect terminal lug (Figure 1, Item 7) and wire for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire.

Prior to performing the following step, inspect glow plug connector (Figure 1, Item 8). Ensure that glow plug connector (Figure 1, Item 8) is in good working order and that no grease, dirt, paint, corrosion or other damage is present.

5. Install connector strip (Figure 1, Item 8). Connect terminal lug (Figure 1, Item 7) to glow plug #1 (Figure 1, Item 4).
6. Secure glow plug connector (Figure 1, Item 8) and terminal lug (Figure 1, Item 7) to glow plugs using four nuts (Figure 1, Item 5) and washers (Figure 1, Item 6).

REPLACEMENT - Continued

NOTE

If the dip-stick bracket was removed to allow access to glow plug #2, reinstall at this time.

7. Connect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in WP 0056).
8. Install top access panel (Figure 1, Item 2) and secure to Genset using 20 bolts, lock washers, and flat washers (not shown).
9. Install exhaust pipe cap (not shown) and secure.
10. Install rear access panel (Figure 1, Items 3).
11. Install cargo restraints (not shown).
12. Start Genset in accordance with Genset Start Procedure (WP 0005).

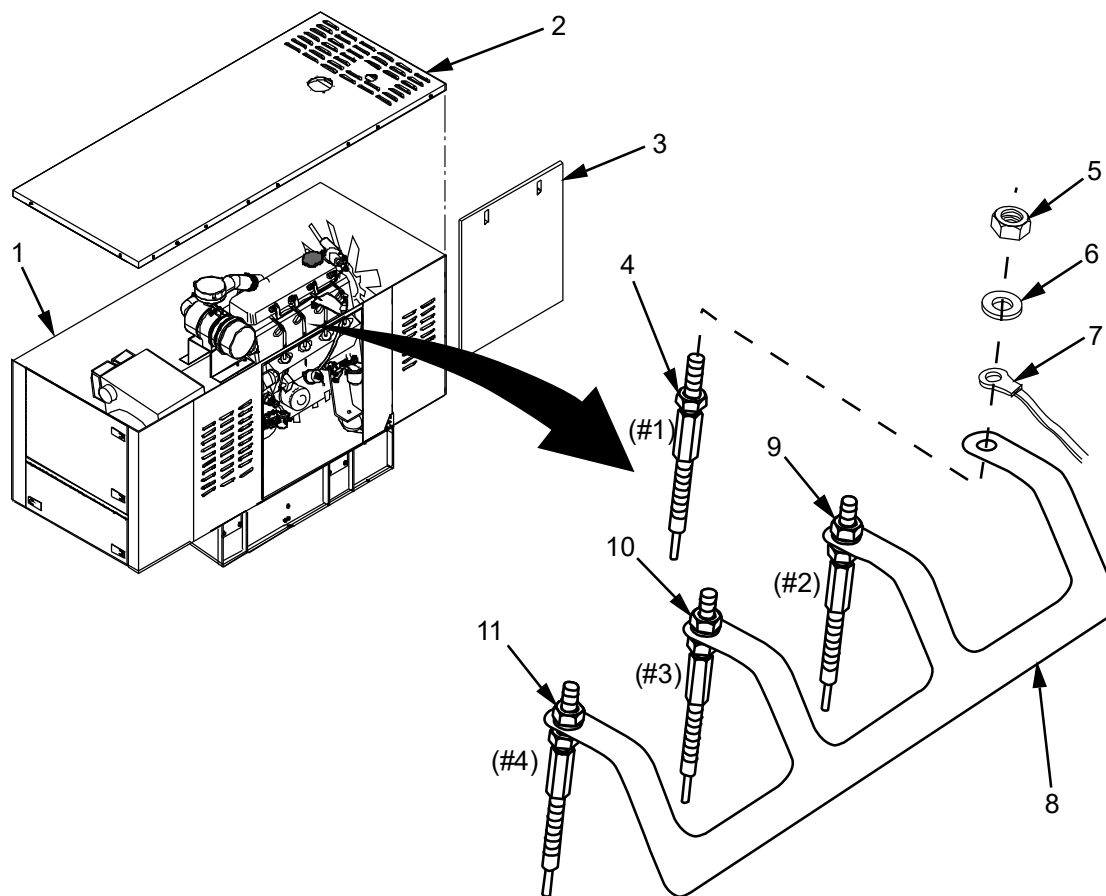


Figure 1. Glow Plug/Connector Strip Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET OIL PRESSURE SWITCH MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal/replacement of the Genset oil pressure switch.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

OIL PRESSURE SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Oil pressure switch
Anti-seize compound (WP 0180, Item 3)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

REMOVAL**WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 2) of Genset.
3. Remove the rear access panel (Figure 1, Item 2) and set aside.

REMOVAL - Continued**NOTE**

The oil pressure switch (Figure 1, Item 3) is located between the oil pressure sending unit (WP 0056) and the fuel filter (WP 0042).

Prior to performing the following step, mark wires (Figure 1, Items 5) and terminals for connectivity.

4. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in WP 0056).

5. Remove and retain two screws (Figure 1, Item 5) and wires (Figure 1, Items 4) connected to oil pressure switch (Figure 1, Items 3).

NOTE

When performing the following step, be cautious of items surrounding oil pressure switch (Figure 1, Item 3).

When performing the following step, use a second wrench to keep mounting elbow from turning.

6. Remove oil pressure switch (Figure 1, Item 3) from engine.

END OF TASK

REPLACEMENT

1. Clean off old anti-seize compound from all threaded areas.

WARNING

Adhesives, solvents, and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing, wash immediately with soap and water.

NOTE

Do not get anti-seize compound on end of oil pressure switch (Figure 1, Item 3) or associated terminals.

2. Apply anti-seize compound to threads of oil pressure switch (Figure 1, Item 3).

CAUTION

When the following step is being performed, do not force oil pressure switch (Figure 1, Item 3) or cross thread. Failure to observe this caution can result in damage to the engine.

3. Install oil pressure switch (Figure 1, Item 3) onto mounting elbow and tighten.

NOTE

Inspect wires (Figure 1, Item 4) and terminals for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire.

4. Secure two wires (Figure 1, Item 4) to oil pressure switch with two screws (Figure 1, Item 5).
5. Connect battery ground cable (black) to battery ground terminal (WP 0056).
6. Install access panel (Figure 1, Item 2).
7. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005).

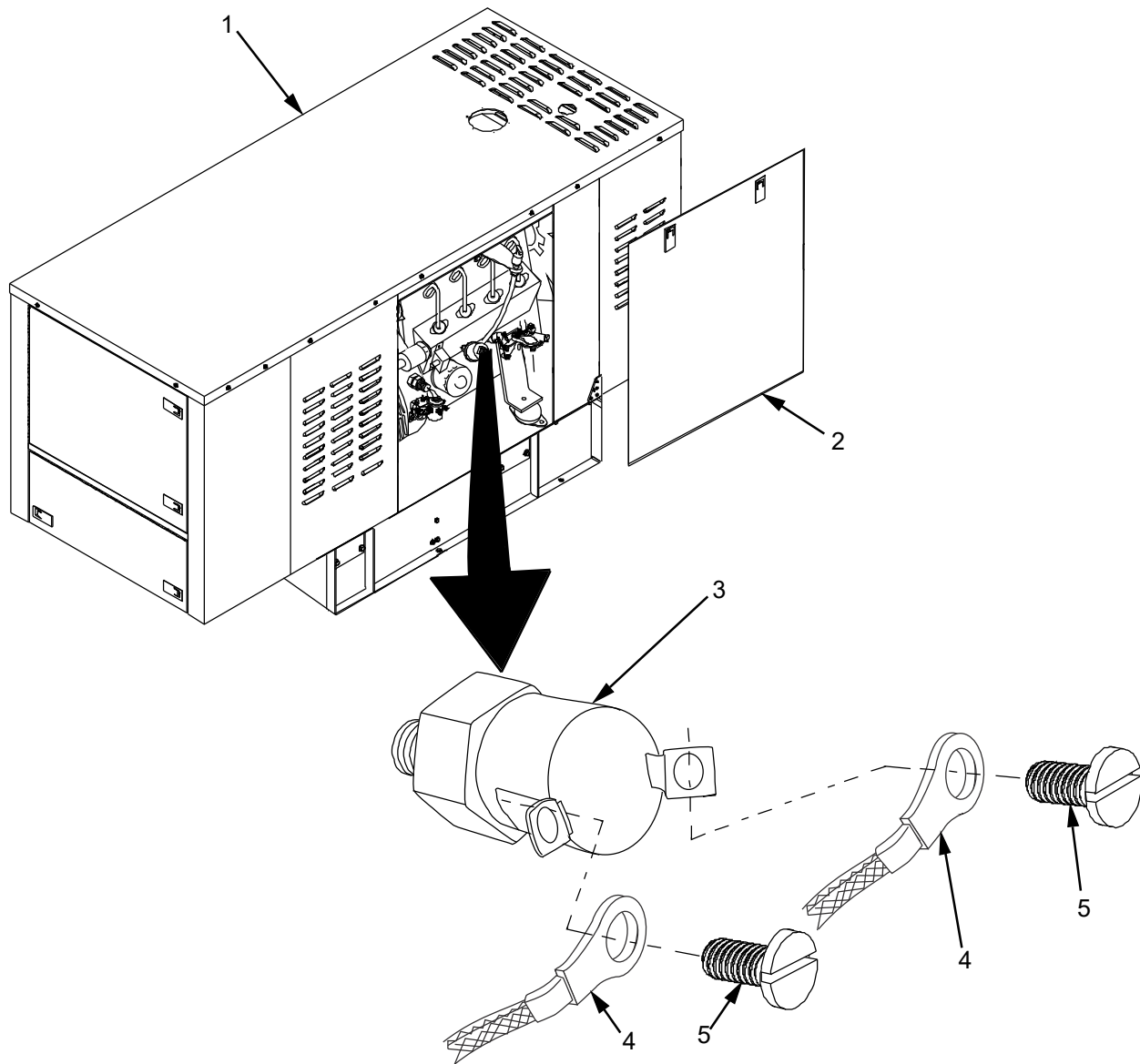


Figure 1. Oil Pressure Switch Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET OIL PRESSURE SENDING UNIT MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the Genset oil pressure sending unit. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

CAUTION

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

OIL PRESSURE SENDING UNIT REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Oil pressure sending unit
Anti-seize compound (WP 0180, Table 1, Item 3)
Cloth, cleaning (WP 0180, Table 1, Item 14)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the access panel (Figure 1, Item 2) and set aside.

NOTE

The oil pressure sending unit (Figure 1, Item 7) is located next to the oil filter.

4. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in WP 0056).
5. Remove nut (Figure 1, Item 3), lock washer (Figure 1, Item 4) and flat washer (Figure 1, Item 5) securing wire (Figure 1, Item 6) to oil pressure sending unit (Figure 1, Item 7). Mark and disconnect wire (Figure 1, Item 6).

REMOVAL - Continued**NOTE**

Use a second wrench to keep mounting elbow from turning.

Be cautious of items surrounding oil pressure sending unit (Figure 1, Item 7).

6. Remove oil pressure sending unit (Figure 1, Item 7) from engine.

END OF TASK**REPLACEMENT**

1. Clean off old anti-seize compound from all threaded areas.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

Do not get anti-seize compound on end of oil pressure sending unit (Figure 1, Item 7).

2. Apply anti-seize compound to threads of oil pressure sending unit (Figure 1, Item 7).

CAUTION

When the following step is being performed, do not force oil pressure sending unit (Figure 1, Item 7) or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

When performing the following step, use a second wrench to keep mounting elbow from turning.

3. Install oil pressure sending unit (Figure 1, Item 7) onto mounting elbow and tighten.

NOTE

Prior to performing the following step, inspect wire (Figure 1, Item 6) and terminal for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire.

4. Install wire (Figure 1, Item 6) onto oil pressure sending unit (Figure 1, Item 7) and secure with nut (Figure 1, Item 3) lock washer (Figure 1, Item 4) and flat washer (Figure 1, Item 5).

REPLACEMENT - Continued

5. Connect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in WP 0056).
6. Install access panel (Figure 1, Item 2).
7. Install cargo restraints (not shown).
8. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005).

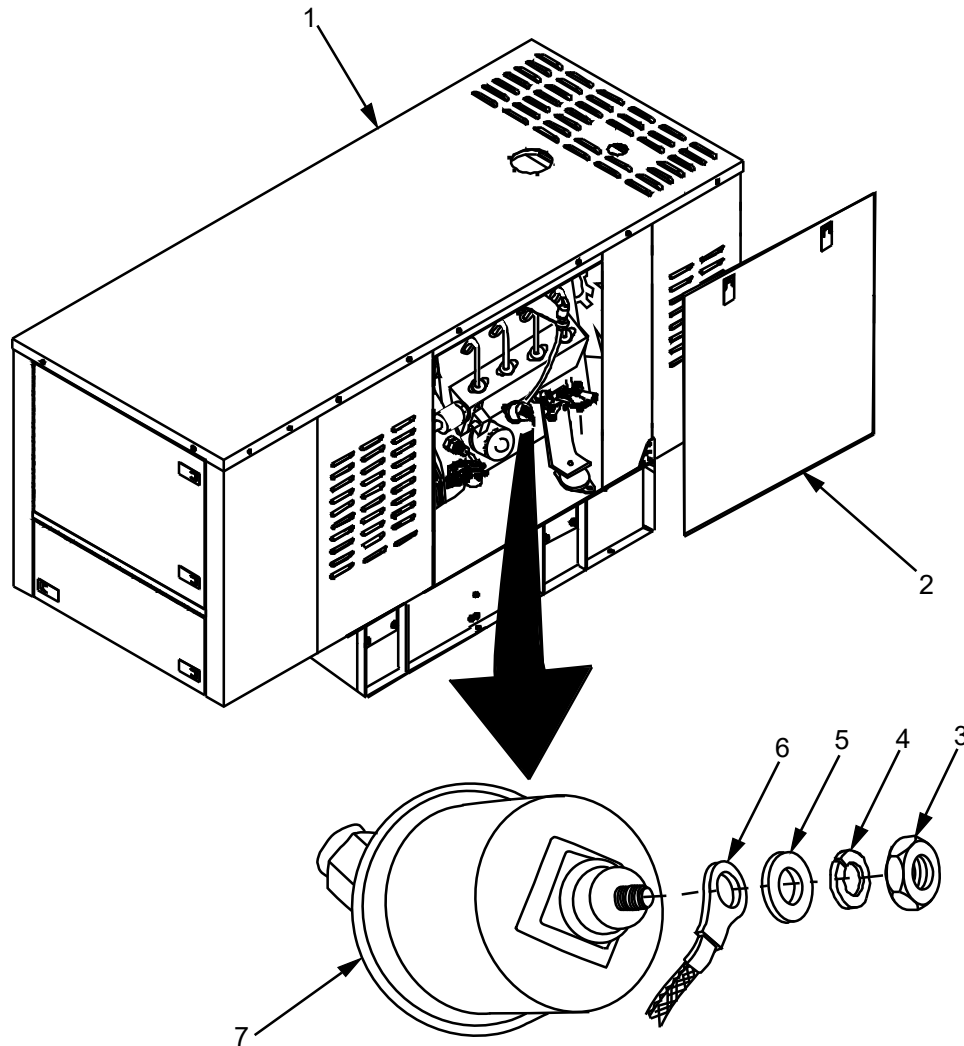


Figure 1. Oil Pressure Sending Unit Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET FUEL SYSTEM MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the following Genset fuel system components:

- Fuel Filter - Inspect
- Fuel Tank Drain Valve - Replace
- Fuel Tank - Replace
- Fuel Hose - Replace
- Fuel Line Heater - Replace

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Never attempt to perform maintenance when Genset in an operational status.
To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of HP-2C/185 UST Trailer.

CAUTION

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of HP-2C/185 UST Trailer.

FUEL FILTER INSPECT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Drip berm
Oil filter wrench
Gloves, Rubber (WP 0180, Table 1, Item 17)

Materials/Parts

Fuel filter

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

REMOVAL

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset (Figure 1, Item 1).
3. Remove rear access panel (Figure 1, Item 2) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

NOTE

The fuel filter (Figure 1, Item 3) is located above the batteries and to the left of the low oil pressure cut-off switch.

Place drip berm under fuel filter (Figure 1, Item 3) to catch any spillage.

5. Using the oil filter wrench, loosen fuel filter.
6. Remove fuel filter and pour fuel into a clean clear container.

END OF TASK

INSPECT

1. After fuel filter has been removed, inspect fuel filter and fuel for signs of water or sediment. If excessive sediment or water is found, drain fuel tank, as described in this WP.

END OF TASK**REPLACEMENT**

1. Fill fuel filter (Figure 1, Item 3) with clean fuel.
2. Install fuel filter onto fuel filter mount (Figure 1, Item 4). Tighten until hand tight.

NOTE

When performing the following step, DO NOT over tighten fuel filter.

3. Tighten fuel filter an additional 1/4 turn with oil filter wrench.
4. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery, and install rear access panel (Figure 1, Item 2).
5. Install access panel (Figure 1, Item 2).
6. Install cargo restraints (not shown).
7. Start Genset in accordance with WP 0005, Genset Start Procedure.

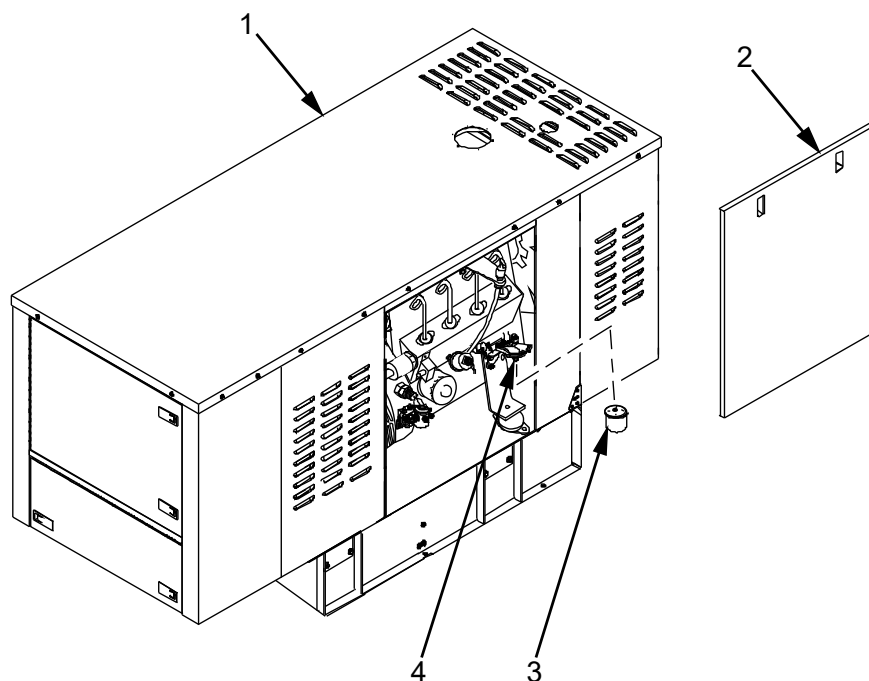


Figure 1. Fuel Filter Inspect.

END OF TASK

FUEL TANK SERVICE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Drip berm
Oil filter wrench
Gloves, Rubber (WP 0180, Table 1, Item 17)
Funnel

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005

Materials/Parts

Fuel filter

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

SERVICE**WARNING**

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT perform maintenance with Genset operating.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of the HP-2C/185 UST Trailer.

1. Verify that Genset (Figure 2, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).

NOTE

The drain valve for each Genset is located under the trailer along the curbside. If necessary, remove fuel filler cap to expedite fuel flow.

Collect fuel in an appropriate chemical-resistant container for disposal through the local servicing Defense Reutilization and Marketing Office.

2. Open fuel filler cap.
3. Place drain pan under drain valve (Figure 2, Item 2).
4. Remove and retain plug (Figure 2, Item 3) and open drain valve (Figure 2, Item 2).

SERVICE - Continued**NOTE**

If Drain valve is leaking, replace.

5. Once fuel tank is empty, close drain valve (Figure 2, Item 2) and install drain plug (Figure 2, Item 3).
6. Replenish fuel tank.
7. Start Genset (Figure 2, Item 1) in accordance with WP 0005, Genset Start Procedure.

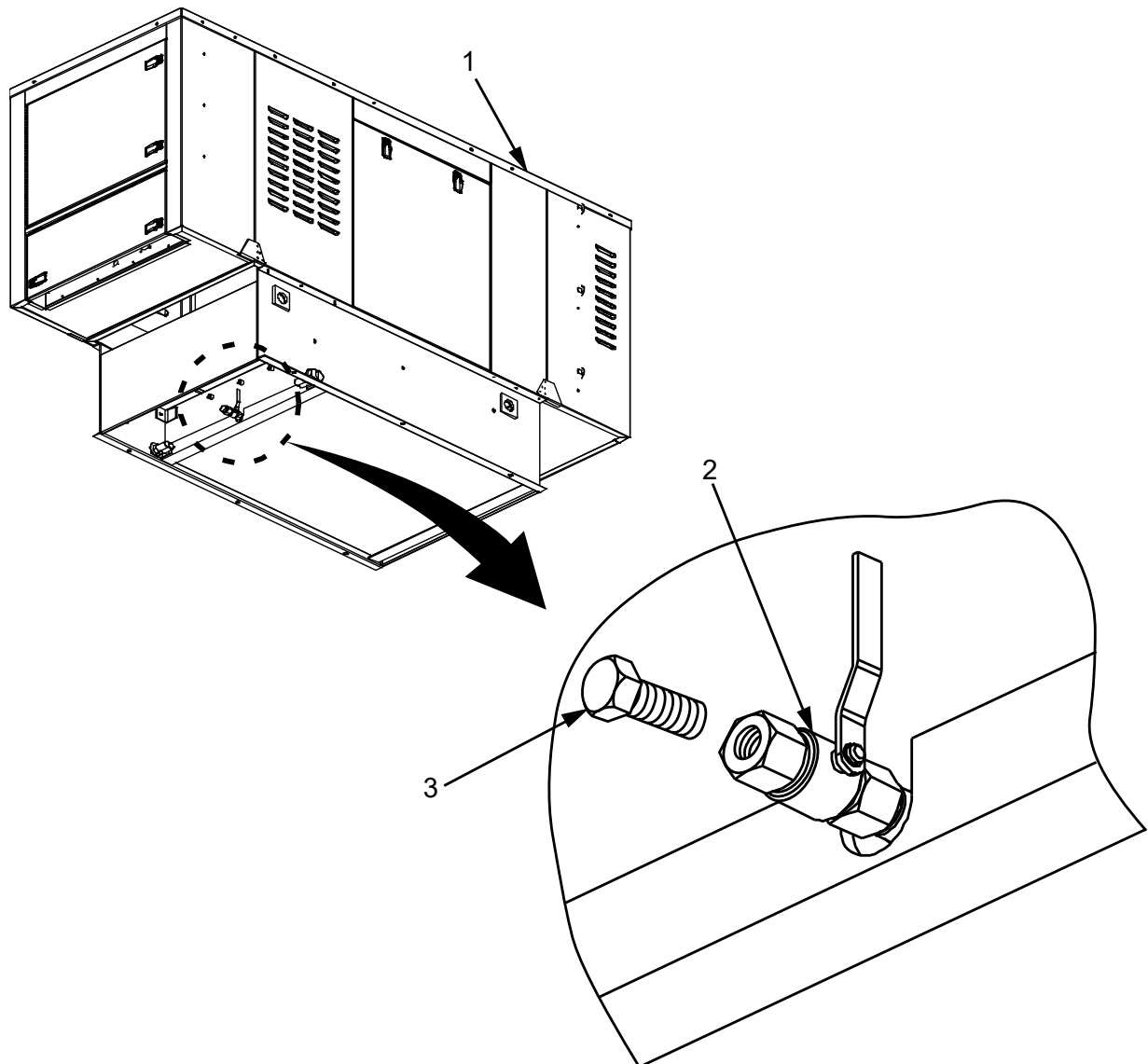


Figure 2. Genset Fuel Tank Drain Location.

END OF TASK

GENSET - FUEL TANK - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)
Standard automotive tool set (WP 0132, Table 2, Item 4)
Lifting device (Hoist/Tow truck/Crane)
Chains/straps

Materials/Parts

Fuel tank
Drain pan
Cloth, cleaning (WP 0180, Table 1, Item 14)
Sealing compound (WP 0180, Table 1, Item 37)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (2)

References

WP 0005, WP 0056, WP 0077
WP 0079

Equipment Condition

Genset shut down
BATTERY SWITCH – OFF
Trailer parked in operational
position
Wheels chocked

WARNING

The Genset for the HP-2C/185 UST Trailer weighs 1,481 lb (673.18 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the Genset without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the Genset is removed, do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to Genset.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow sufficient time for components to cool down.

Do not enter Genset when operational. Exposed moving parts (i.e. fan blade) present. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

To avoid possibility of counter balance, ensure that tongue jack and jack assemblies are lowered to ground level to support trailer.

Empty fuel tank weighs 33 lbs. (14.96 kg) empty and can be heavy and bulky. It requires two persons to safely remove and replace tank. Failure to observe this warning can result in serious injury or death to personnel.

REMOVAL

1. Prior to performing the following steps ensure that:
 - Genset has been shut down in accordance with Genset Shut Down Procedure (WP 0005).
 - Genset is at ambient temperature.
 - All cables have been disconnected from power distribution panel on Genset.
 - If applicable, disconnect auxiliary fuel lines from Genset.
 - Fuel has been completely drained, if possible tilt trailer from curbside UP to drain tank.
 - Trailer is level.
 - Wheels are chocked.
 - Steps are down.
 - All cargo has been removed trailer and immediate area around Genset is free and clear of Items (i.e., storage bags, ground cables, etc.).
2. Remove front and rear access panels of Genset and set aside.
3. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

When performing the following step, DO NOT attempt to remove hose from fitting.

Radiator access panel needs to be removed to get to top clamp at filler neck (as per this WP).

4. Using either a flat tip screw driver or socket and ratchet, loosen the fuel hose clamps (Figure 3, Item 1) and remove hose (Figure 3, Items 2).

NOTE

When performing the following step, DO NOT attempt to remove hose from fitting.

5. Using either a flat tip screw driver or socket and ratchet, loosen the fuel hose clamps (Figure 3, Item 18) securing fuel lines (Figure 3, Item 19) and slide out of the way.
6. Place a drain pan or absorbent pad under the connections to be broken in case of spillage.
7. Grasp hoses (Figure 3, Item 19) and rotate the hose close to the connection to break the connection.
8. Loosen hose connectors (Figure 3, Items 3 and 4) with an open end wrench. Remove hose connectors and place in drain pan or onto absorbent pad for use in replacement tank.
9. Remove and retain four mounting bolts (Figure 3, Item 7), eight washers (Figure 3, Item 6), and four lock nuts (Figure 3, Item 8) securing fuel tank support strut (Figure 3, Item 11) with Spacer (Figure 3, Item 10) to Genset frame. Discard four lock nuts (Figure 3, Item 8).
10. Rotate drain valve (Figure 3, Item 12) to clear fuel tank support strut (Figure 3, Item 11) opening.

REMOVAL – Continued**NOTE**

Due to CARC paint, corrosion, etc. fuel tank support strut (Figure 3, Item 11) may be difficult to remove. It may be easier to slide fuel tank support strut (Figure 3, Item 11) back as far as possible without removing from Genset frame.

11. Move fuel tank support strut (Figure 3, Item 11) and spacer (Figure 3, Item 10) away from fuel tank.
12. Loosen but do not remove four lock nuts (Figure 3, Item 8) and flat washers (Figure 3, Item 6) from inside mounts on fuel tank (Figure 3, Item 17).

NOTE

Once Genset has been removed from trailer, move Genset to an open area to allow safer, easier access to fuel tank and to prevent damaging axle and other components on underside of trailer

13. Using appropriate lifting device and appropriately trained personnel remove Genset from trailer bed by performing steps 6, 8 through 13 of WP 0079, Genset Removal.
14. Lower Genset to a workable height (2-3 ft) above ground level.
15. Loosen exhaust and radiator connections (WP 0079).
16. Loosen motor mounts (WP 0079)

NOTE

One lift point is located on the engine and one lift point is located on the generator (WP 0079).

17. Attach chain/sling to two lift points (WP 0079).
18. Remove and retain four mounting nuts and washers securing EGA to shock mounts on frame (WP 0079).
19. Raise EGA 4-5 inches outside Genset enclosure.
20. Remove and retain four lock nuts (Figure 3, Item 8) and flat washers (Figure 3, Item 6) loosened in step 12. Discard four lock nuts (Figure 3, Item 8)

WARNING

Empty fuel tank weighs 33 lbs. (14.96 kg) empty and can be heavy and bulky. It requires two persons to safely remove and replace tank. Failure to observe this warning can result in serious injury or death to personnel.

21. Remove and retain four bolts (Figure 3, Item 7), flat washers (Figure 3, Item 6) and spacers (Figure 3, Item 5) securing fuel tank (Figure 3, Item 17) to Genset frame.
22. Remove and retain digital fuel level sensor (Figure 3, Item 15) and drain valve (Figure 3, Item 11) for use on replacement tank.

END OF TASK

REPLACEMENT**NOTE**

When replacing heater (hydronic) fuel hose connectors (Figure 3, Item 9), apply a thin layer of sealing compound to connector threads.

1. Inspect, replace if necessary, and install digital fuel level sensor (Figure 3, Item 15) and drain valve (Figure 3, Item 12) in replacement fuel tank (Figure 3, Item 7). Do not completely tighten drain valve (Figure 3, Item 12) until after fuel tank and fuel tank support strut (Figure 3, Item 11) are installed.
2. Using appropriate lifting device and appropriately trained personnel, raise Genset to a workable height (2-3 ft.) above ground level.
3. Place replacement fuel tank (Figure 3, Item 17) in approximate location under Genset.
4. Using appropriate number of personnel, raise fuel tank (Figure 3, Item 17) up into Genset. Install four bolts (Figure 3, Item 7), flat washers (Figure 3, Item 6) and spacers (Figure 3, Item 5). Spacers (Figure 3, Item 5) go between brackets welded to fuel tank and Genset frame.
5. Loosely install four new lock nuts (Figure 3 Item 8) and flat washers (Figure 3, Item 6).
6. Reposition Genset enclosure on trailer per WP 0079, Genset Replacement, steps 5 - 8, 10, and 11.

NOTE

Prior to installing fuel tank support strut (Figure 3, Item 11), ensure Spacer (Figure 3, Item 10) is present and securely fastened.

7. Install fuel tank support strut (Figure 3, Item 11) and spacer (Figure 3, Item 10) to Genset frame and align holes. Loosely install four mounting bolts (Figure 3, Item 7), eight washers (Figure 3, Item 6), and four new lock nuts (Figure 3, Item 8).
8. Align fuel tank and tighten four new lock nuts (Figure 3, Item 8) and bolts (Figure 3, Item 7) and secure fuel tank (Figure 3, Item 17) to Genset frame.
9. Tighten drain valve (Figure 3, Item 12). Once drain valve is tight ensure valve is orientated properly.
10. Tighten four mounting bolts (Figure 3, Item 7), eight washers (Figure 3, Item 6), and four new lock nuts (Figure 3, Item 8) that secure tank support strut (Figure 3, Item 11) to Genset frame.

NOTE

Over tightening the hose clamps can result in damage to the hose and premature failure.

11. Install fuel connections (Figure 3, Items 3 & 4) and fuel hoses (Figure 3, Item 19). Tighten clamps (Figure 3, Item 18).
12. Loosely assemble fuel source hose (Figure 3, Items 14), elbow (Figure 3, Item 9), and hose clamps (Figure 3, Item 13) and install onto fuel tank (Figure 3, Item 17). Using either a flat tip screw driver or socket and ratchet, tighten all hose clamps (Figure 3, Item 13).
13. Ensure drain valve (Figure 3, Item 12) is shut.

END OF TASK

COMPLETION

1. Reconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
2. Fill tank with fuel and check for leaks.
3. Clean up any excess spillage from base of the Genset.
4. Prime engine as described in WP 0077 and start Genset in accordance with WP 0005, Genset Start Procedure
5. Perform all necessary PMCS on engine (WP 0032).
6. Install front and rear access panels and cargo restraints.

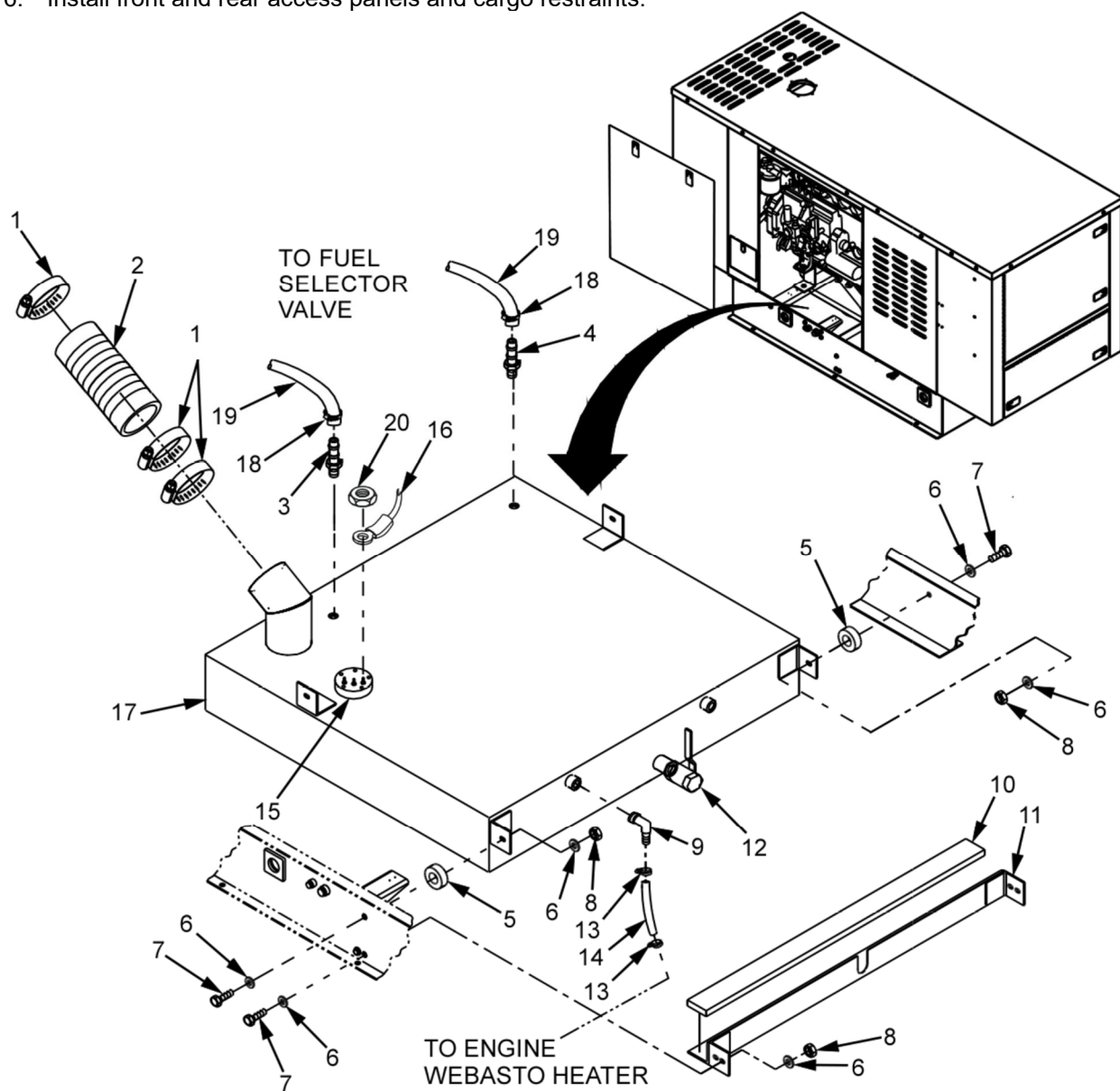


Figure 3. Genset Fuel Tank - Replace.

END OF TASK

GENSET FUEL HOSE - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Materials/Parts

Fuel hose

Cloth, cleaning (WP 0180, Table 1, Item 14)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (2)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH – OFF
Trailer parked in operational
position
Wheels chocked

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset is in operation. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove front and rear access panels.
3. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

NOTE

Identify the fuel hose to be replaced. Refer to RPSTL (Chapter 8) for location and part number of the various fuel hoses.

4. Loosen both ends of the fuel hose to be replaced.
5. Place a drain pan or absorbent pad under the connection to be broken in case of spillage.
6. Pull the fuel hose away from the connector. Repeat for other end of fuel hose.
7. Discard hose but retain workable hardware.

END OF TASK

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REPLACEMENT**NOTE**

Ensure that replacement hose is the same length and diameter of the original hose.

Identify the fuel hose to be replaced. Refer to RPSTL (Chapter 8) for location and part number of the various fuel hoses.

Ensure that the hose clamps are placed on the hose in such a way that the screws will be accessible once slid into place.

1. Install fuel hose onto the first connection using retained hardware.
2. Repeat for other end of fuel hose.
3. Ensure hose is not twisted.
4. Tighten connections.

NOTE

Over tightening a hose can result in damage to the hose and premature failure.

5. Clean up any excess spillage from base of the Genset.
6. Reconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
7. Install front and rear access panels and cargo restraints.
8. Prime fuel system as per WP 0077.
9. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK

GENSET FUEL LINE HEATER – REPLACE

INITIAL SETUP:**Tools and Special Tools**

Standard Automotive Tool Set (WP 0132, Table 2, Item 5)
Drain pan

Personnel Required

Power Generation Equipment
Repairer, MOS 91D (1)

Materials/Parts

Fuel line heater
Cloth, cleaning (WP 0180, Item 12)
Teflon tape (WP 0180, Item 45)

References

WP 0005, WP 0056, WP 0069

Equipment Condition

Genset Shut Down
Battery Switch OFF

WARNING

Never attempt to perform maintenance when Genset is in operation.
To prevent serious injury to personnel or damage to equipment, DO NOT
enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure) and that cargo bags have been removed from area between Genset and ECU.
2. Remove front and rear access panels from Genset.
3. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in WP 0056).
4. Drain coolant as described in WP 0069.

NOTE

Use a small pan or cup to catch any excess fuel in fuel lines.

5. Remove fuel hose (Figure 4, Item 13) going to fuel selector valve (not shown) from fuel line elbow (Figure 4, Item 10) on fuel line heater (Figure 4, Item 4) by loosening hose clamp (Figure 4, Item 11).
6. Remove fuel hose (Figure 4, Item 12) going to fuel injection pump (not shown) from fuel line elbow (Figure 4, Item 10) on fuel line heater (Figure 4, Item 4) by loosening hose clamp (Figure 4, Item 11).

NOTE

Use a small pan or cup to catch any excess coolant in hoses.

7. Remove coolant hose (Figure 4, Item 14) going to water pump from coolant hose nipple (Figure 4, Item 16) on fuel line heater (Figure 4, Item 4) by loosening hose clamp (Figure 4, Item 2).

REMOVAL - Continued

8. Remove coolant hose (Figure 4, Item 1) going to oil pan from coolant hose elbow (Figure 4, Item 3) on fuel line heater (Figure 4, Item 4) by loosening hose clamp (Figure 4, Item 2).

NOTE

There may still be fuel and coolant in the fuel line heater.

9. Remove fuel line heater (Figure 4, Item 4) with mounting bracket (Figure 4, Item 5) from engine block by removing bolt (Figure 4, Item 8), lock washer (Figure 4, Item 7), and flat washer (Figure 4, Item 6).
10. Loosen but do not remove mounting bracket lower bolt (Figure 4, Item 15) and lock nut (Figure 4, Item 9) and remove fuel line heater (Figure 4, Item 4) from mounting bracket (Figure 4, Item 5).
11. Remove both fuel line elbows (Figure 4, Item 10) from fuel line heater (Figure 4, Item 4) and set aside for use with the new fuel line heater.
12. Remove coolant hose nipple (Figure 4, Item 16), coolant hose elbow (Figure 4, Item 13), and set aside for use with new fuel line heater.
13. Properly discard of fuel line heater (Figure 4, Item 4).

END OF TASK**REPLACE****NOTE**

Apply Teflon tape to all elbows and nipples being attached to fuel line heater.

1. Properly orientate fuel line heater (Figure 4, Item 4) with label facing out so you can read it.
2. Attach two fuel line elbows (Figure 4, Item 10) as shown in Figure 4.
3. Attach coolant hose nipple (Figure 4, Item 16) and coolant hose elbow (Figure 4, Item 3) to fuel line heater (Figure 4, Item 4) as shown in Figure 4.
4. Loosely place fuel line heater (Figure 4, Item 4) onto mounting bracket (Figure 4, Item 5) and loosely attach mounting bracket to engine block with bolt (Figure 4, Item 8), lock washer (Figure 4, Item 7), and flat washers (Figure 4, Item 6).

NOTE

When attaching hoses to fuel line heater ensure that hoses are not kinked.

5. Attach coolant hose (Figure 4, Item 14) coming from water pump (not shown) to coolant hose nipple (Figure 4, Item 16) on fuel line heater (Figure 4, Item 4) and secure with clamp (Figure 4, Item 2).
6. Attach coolant hose (Figure 4, Item 1) coming from oil pan (not shown) to coolant hose elbow (Figure 4, Item 3) on fuel line heater (Figure 4, Item 4) and secure with clamp (Figure 4, Item 2).

REPLACE - Continued

7. Attach fuel hose (Figure 4, Item 13) coming from fuel selector valve (not shown) to fuel line elbow (Figure 4, Item 10) on fuel line heater (Figure 4, Item 4) and secure with clamp (Figure 4, Item 11).
8. Attach fuel hose (Figure 4, Item 12) coming from injection pump (not shown) to fuel line elbow (Figure 4, Item 10) on fuel line heater (Figure 4, Item 4) and secure with clamp (Figure 4, Item 11).
9. Secure fuel line heater (Figure 4, Item 4) to engine block by tightening mounting bracket (Figure 4, Item 5) bolts (Figure 4, Items 8 & 15) and lock nut (Figure 4, Item 9).

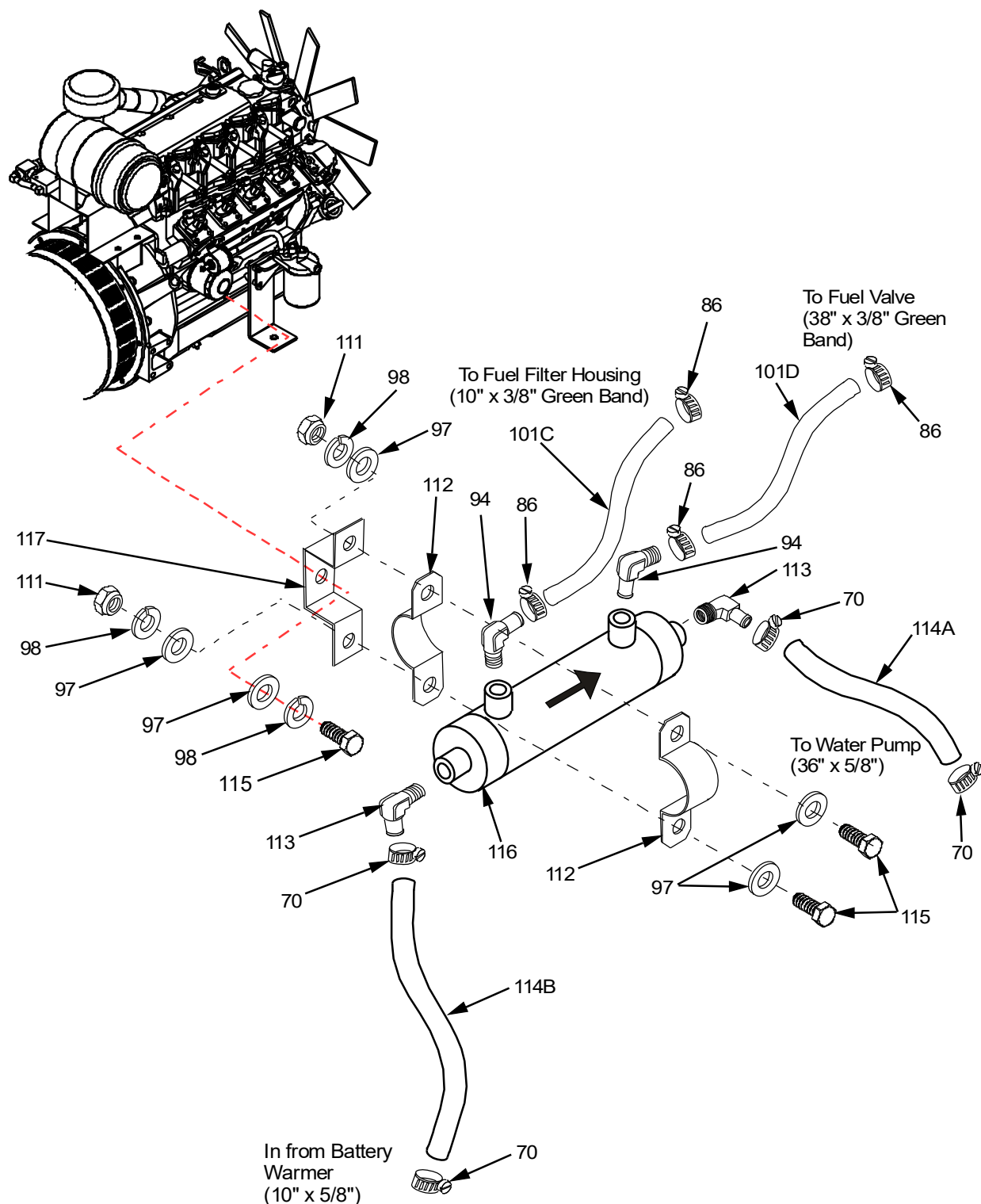


Figure 4. Genset Fuel Line Heater - Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET STARTER MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset starter. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

WARNING

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

STARTER - REPLACE

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set, (WP 0132, Table 2, Item 4)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

Starter

References

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

REMOVAL**WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front access panel (Figure 1, Item 2) and set aside.
4. Remove rear access panel (not shown) and disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

CAUTION

To prevent serious injury to personnel place battery cable far enough away from battery terminal so that cable does not inadvertently touch positive (+) terminal on battery.

5. Disconnect red cable(s) (Figure 1, Item 6) from positive (+) terminal of battery and set aside (WP 0056).
6. Remove and retain nut (Figure 1, Item 3) and lock washer (Figure 1, Item 4) from starter terminal (Figure 1, Item 5). Discard lock washer (Figure 1, Item 4).

REMOVAL – Continued

7. Disconnect battery cable (Figure 1, Item 6) from starter terminal (Figure 1, Item 5) and set aside. Loosely install nut (Figure 1, Item 3) and new lock washer (Figure 1, Item 4) onto starter terminal (Figure 1, Item 5).
8. Unplug cable (Figure 1, Item 7) from post (Figure 1, Item 11) on starter.
9. Remove and retain lower mounting bolt (Figure 1, Item 10) from starter (Figure 1, Item 9).
10. Remove and retain upper mounting bolt (Figure 1, Item 8) from starter (Figure 1, Item 9).
11. Pull starter (Figure 1, Item 9) away from starter mount on engine assembly and set aside.

END OF TASK**REPLACEMENT**

1. Insert starter (Figure 1, Item 9) into the starter mount on engine and secure using two bolts (Figure 1, Items 8 and 10).
2. Using torque wrench, tighten two bolts (Figure 1, Items 8 and 10) on starter (Figure 1, Item 9) to 93~113 ft./lb (69~83 n-m/9.5~11.5 kgf-m).

NOTE

Prior to performing the following step, inspect terminals on battery cable (Figure 1, Item 6) and second red wire (Figure 1, Item 7) for connectivity. Ensure that wires have not become brittle and that there are no nicks, cuts or other damage to wires.

3. Connect battery cable (Figure 1, Item 6) to starter terminal (Figure 1, Item 5). Secure to starter terminal (Figure 1, Item 5) with nut (Figure 1, Item 3) and new lock washer (Figure 1, Item 4).
4. Connect cable (Figure 1, Item 7) to post (Figure 1, Item 11) on starter (Figure 1, Item 9).
5. Connect battery cable (Figure 1, Item 6) to positive (+) terminal of battery (WP 0056).
6. Connect battery ground cable (black) to battery ground terminal (WP 0056, Figure 2, Item 26) to battery) and install rear access panel (not shown).
7. Install front access panel (Figure 1, Item 2).
8. Install cargo restraints (not shown).
9. Start Genset in accordance with WP 0005, Genset Start Procedure.

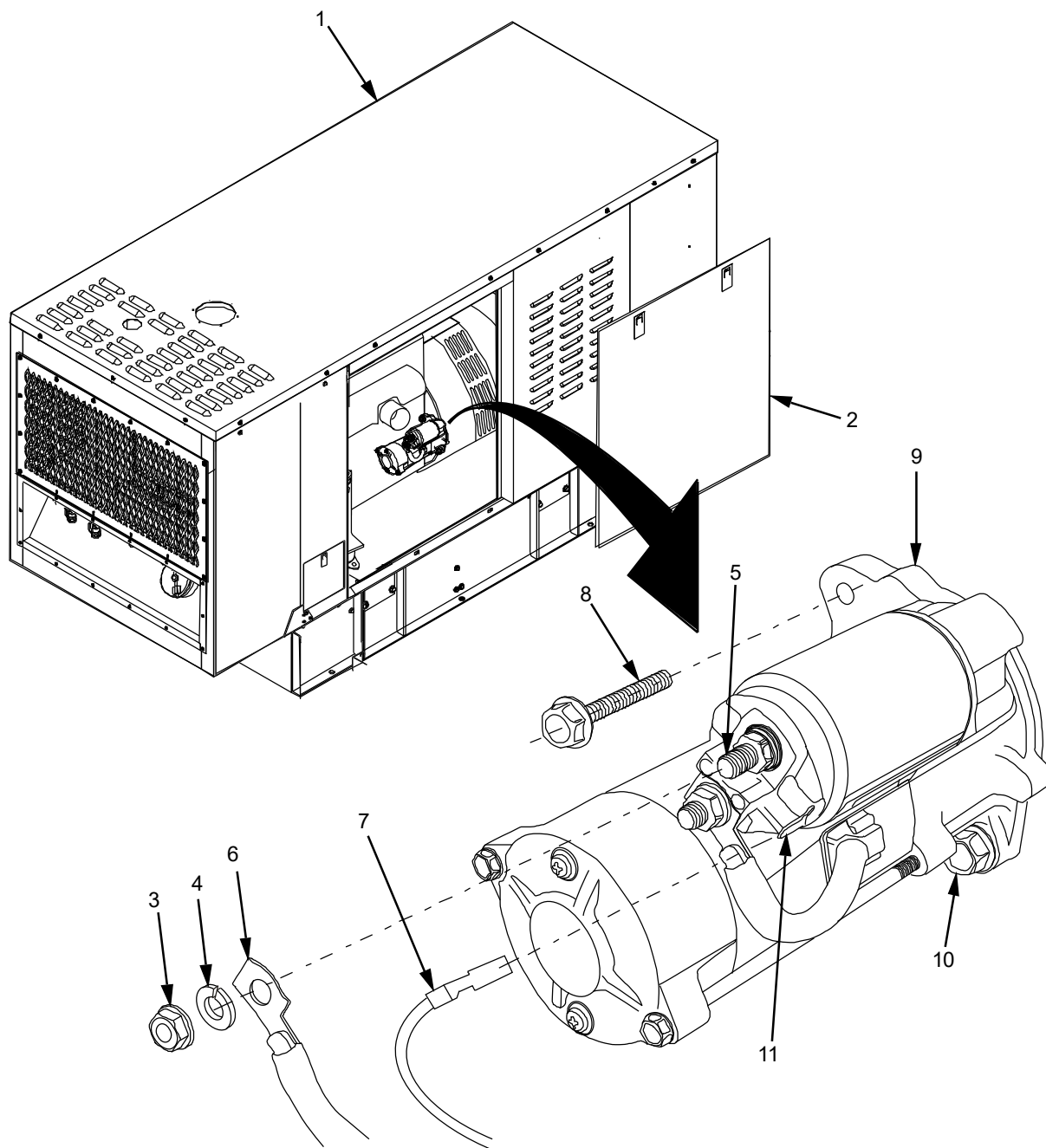


Figure 1. Starter - Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET DIESEL SPEED SENSOR MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the Genset diesel speed sensor. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

DIESEL SPEED SENSOR REMOVAL/INSPECT/TEST/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Speed sensor, diesel
Anti-seize compound (WP 0180, Table 1, Item 3)
Cloth, cleaning (WP 0180, Table 1, Item 14)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

NOTE

The diesel speed sensor (Figure 1, Item 4) is located just left of the fuel pump.

TEST

1. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005).
2. Set multimeter to read VAC.
3. Touch terminals (Figure 1, items 5 and 6) of diesel speed sensor (Figure 1, Item 4) with meter leads. Multimeter should read between 2.5 and 5 VAC. If meter indication not with-in spec replace diesel speed sensor.

END OF TASK

REMOVAL

1. Shut Genset (Figure 1, Item 1) down and set BATTERY SWITCH to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 2).
3. Remove rear access panel (Figure 1, Item 2) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (if necessary, refer to procedure in WP 0056).
5. Disconnect two terminals (Figure 1, Items 5 and 6) coming off of diesel speed sensor (Figure 1, Item 4) from engine harness.

NOTE

When performing the following step, be observant of all items around the diesel speed sensor (Figure 1, Item 4).

6. Loosen locking nut (Figure 1, Item 3) on diesel speed sensor (Figure 1, Item 4).
7. Loosen diesel speed sensor (Figure 1, Item 4) and remove from engine.

END OF TASK**INSPECTION**

Check head of diesel speed sensor (Figure 1, Item 4) for evidence of scraping or striking the fly wheel. If damage is evident replace sensor with new one.

END OF TASK**REPLACEMENT**

1. Clean off old anti-seize compound from all threaded areas.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

Do not get anti-seize compound on ends of diesel speed sensor (Figure 1, Item 4).

2. Apply anti-seize compound to threads of diesel speed sensor (Figure 1, Item 4).

REPLACEMENT – Continued**CAUTION**

When the following step is being performed, diesel speed sensor (Figure 1, Item 4) should screw in without resistance. Do not force diesel speed sensor (Figure 1, Item 4) or cross thread. Failure to observe this caution can result in damage to the engine.

3. Install diesel speed sensor (Figure 1, Item 4). Tighten until diesel speed sensor (Figure 1, Item 4) bottoms out.

NOTE

Failure to back diesel speed sensor (Figure 1, Item 4) off 1/4 turn can result in magnetic pickup on diesel speed sensor (Figure 1, Item 4) striking the fly wheel and becoming damaged thus making it unserviceable.

Backing diesel speed sensor (Figure 1, Item 4) off more than 1/4 turn can prevent magnetic pickup on diesel speed sensor (Figure 1, Item 4) from detecting the rotation of the fly wheel.

4. Turn diesel speed sensor (Figure 1, Item 4) back counter clockwise 1/4 turn.
5. Tighten locking nut (Figure 1, Item 3) (clockwise).
6. Connect two terminals (Figure 1, Items 5 and 6) coming off of diesel speed sensor (Figure 1, Item 4) to engine harness.
7. Connect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in WP 0056).
8. Install rear access panel (Figure 1, Item 2).
9. Install cargo restraints (not shown).
10. Start Genset in accordance with Genset Start Procedure (WP 0005).

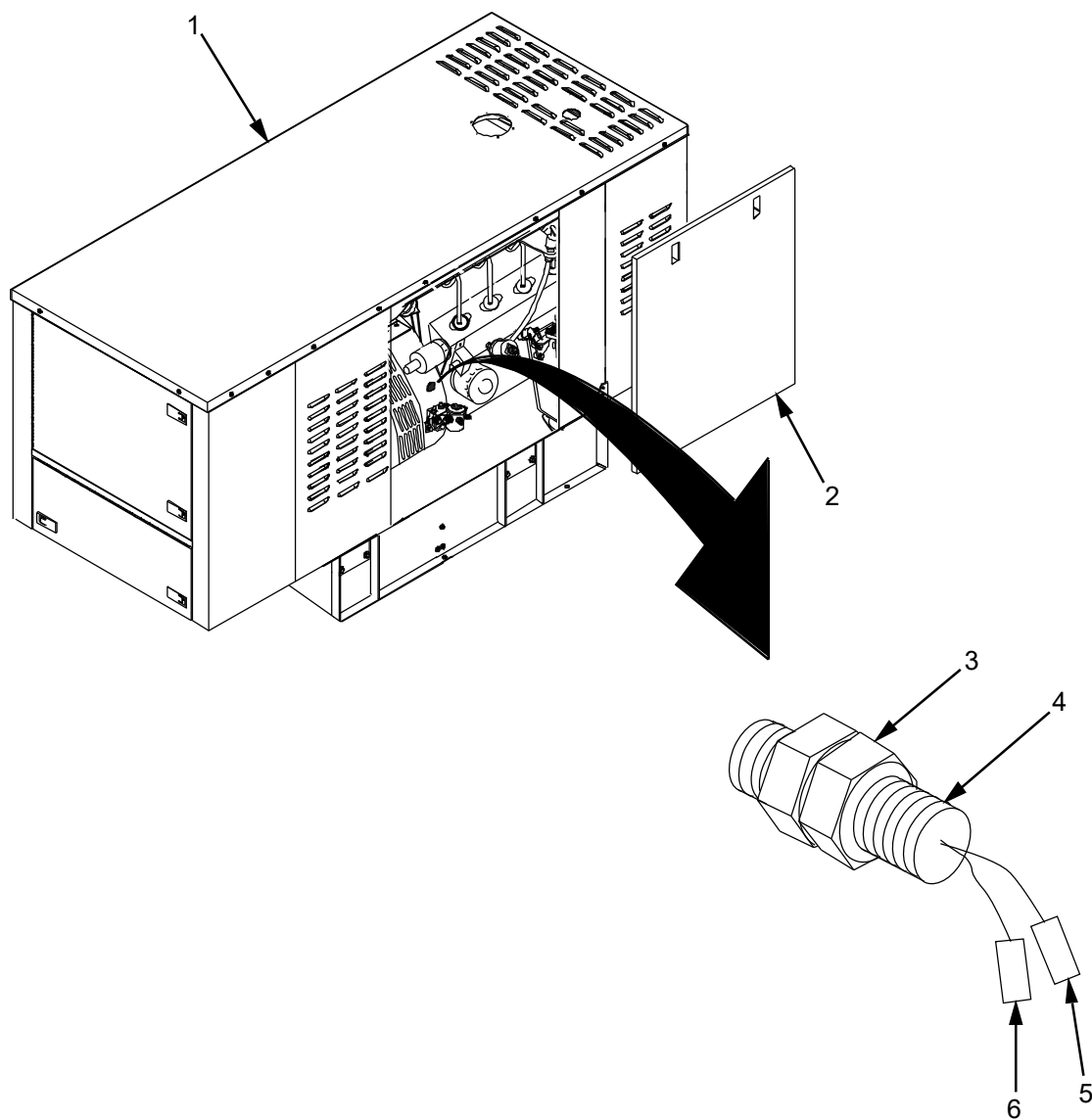


Figure 1. Diesel Speed Sensor Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET ELECTRIC FUEL PUMP MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset electric fuel pump. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of the HP-2C/185 UST Trailer.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

ELECTRIC FUEL PUMP - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Electric fuel pump
Cloth, cleaning (WP 0180, Table 1, Item 14)

References

WP 0005, WP 0056, WP 0081

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

REMOVAL**WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of the HP-2C/185 UST Trailer.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 2).
3. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

NOTE

The electric fuel pump (Figure 1, Item 3) is located above the oil filter.

Wires may be protected by protective cover that should be removed for use on new parts.

4. Disconnect electrical connector (Figure 1, Item 10) from wiring harness.
5. Remove and retain nut (Figure 1, Item 11) on electric fuel pump mounting bracket (Figure 1, Item 13).

REMOVAL – Continued

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6. Disconnect electric fuel pump ground wire (Figure 1, Item 12).

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

7. Loosen two clamps (Figure 1, Item 4) and disconnect input and output fuel lines (Figure 1, Items 5 and 9).
8. Remove and retain two bolts (Figure 1, Item 8), lock washers (Figure 1, Item 7), and flat washer (Figure 1, Item 6). Discard lock washers (Figure 1, Item 7).
9. Properly dispose of electric fuel pump (Figure 1, Item 3).
10. Bolt (Figure 1, Item 14) will only be removed if mounting bracket (Figure 1, Item 13) is to be removed.

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps, inspect grommets (Figure 1, Item 15) and fuel lines (Figure 1, Items 5 and 9) for cracks, dryness, or other visible signs of wear or damage. If grommets (Figure 1, Item 15) or fuel lines (Figure 1, Items 5 and 9) appear excessively worn or are damaged, do not use.

Prior to performing the following steps, inspect electrical connector (Figure 1, Item 10), ground wire (Figure 1, Item 12) and engine wire harness terminals (not shown) for connectivity. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire. Ensure that electrical connectors are free and clear of grease, dirt or other contaminants that may impede electrical connectivity. If damage is noted, refer to WP 0081 for wiring repairs.

Position electric fuel pump so that arrow on pump body is on top and pointing toward rear of engine. Incorrect orientation will prevent proper fuel flow

1. Secure electric fuel pump (Figure 1, Item 3) to electric fuel pump mounting bracket (Figure 1, Item 13) using two bolts (Figure 1, Item 8), new lock washers (Figure 1, Item 7), and flat washers (Figure 1, Item 6).
2. Connect electric fuel pump ground wire (Figure 1, Item 12) to electric fuel pump mounting bracket (Figure 1, Item 13) and secure using nut (Figure 1, Item 11).

REPLACEMENT - Continued**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of the HP-2C/185 UST Trailer.

3. Connect input and output fuel lines (Figure 1, Items 5 and 9) and tighten clamps (Figure 1, Item 4).
4. Connect electrical connector (Figure 1, Item 10) on electric fuel pump (Figure 1, Item 3) to wiring harness.

NOTE

If wire protective cover was removed install onto wires and secure with electrical tape.

5. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
6. Install rear access panel (Figure 1, Item 2).
7. Install cargo restraints (not shown).
8. Start Genset in accordance with WP 0005, Genset Start Procedure.

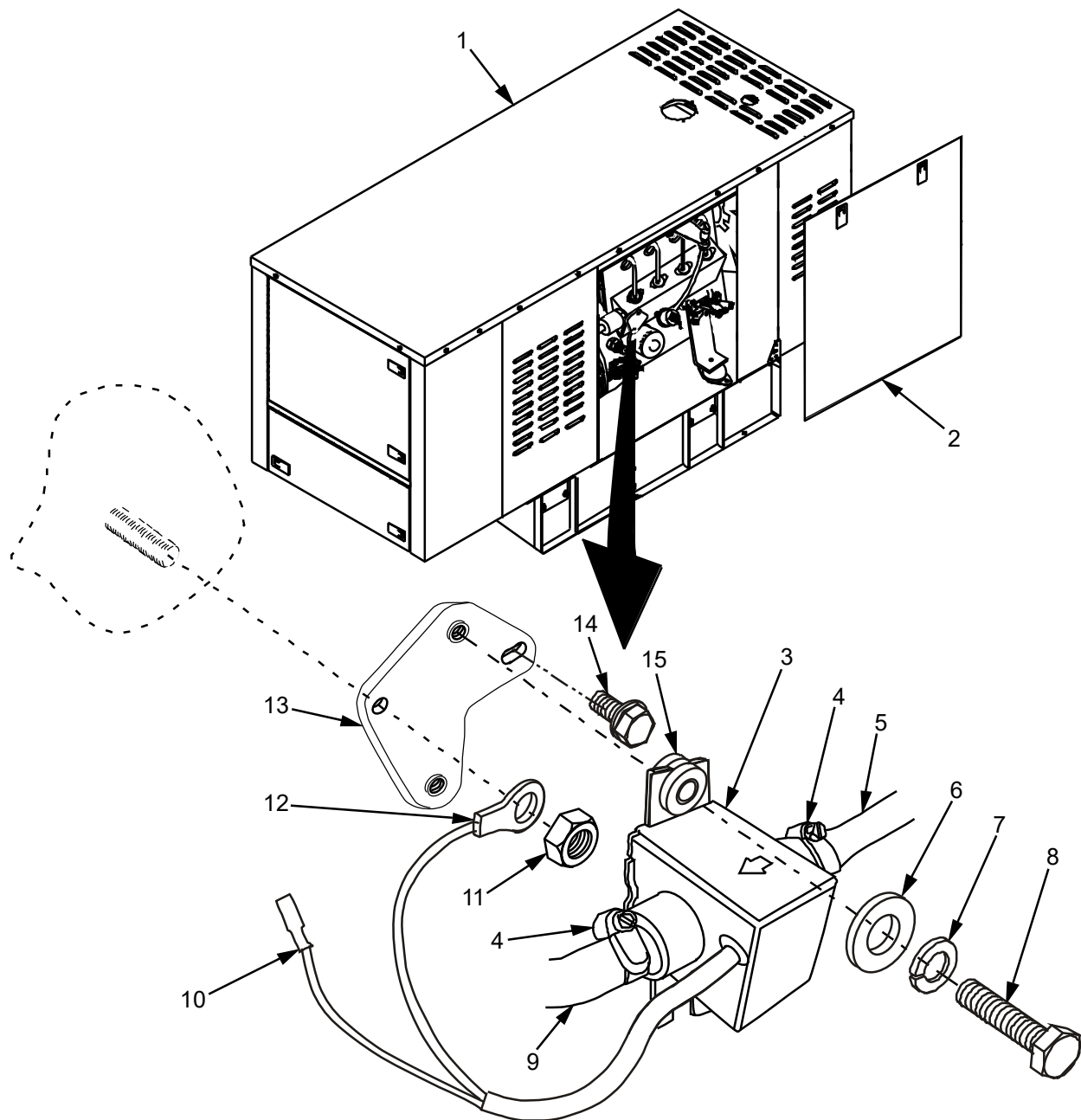


Figure 1. Electric Fuel Pump - Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET COOLANT HIGH TEMPERATURE CUTOFF SWITCH MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the engine coolant temperature switch.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

COOLANT HIGH TEMPERATURE CUTOFF SWITCH - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Coolant high temperature switch
Tape, Antisiezing (WP 0180, Table 1, Item 45)**References**

WP 0005, WP 0056, WP 0081

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove front access panel (Figure 1, Item 2) and set aside.
3. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
4. Remove rear access panel (not shown) and disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

NOTE

The coolant high temperature cutoff switch (Figure 1, Item 3) is located above the alternator.

5. Remove and retain two screws (Figure 1, Item 5) and terminal lugs (Figure 1, Items 4) connected to coolant high temperature cutoff switch (Figure 1, Item 3).

REMOVAL – Continued**NOTE**

When performing the following step, be cautious of items surrounding coolant high temperature cutoff switch (Figure 1, Item 3).

6. Remove coolant high temperature cutoff switch (Figure 1, Item 3) from engine.

END OF TASK**REPLACEMENT**

1. Apply Tape, Antisiezing to threads of coolant high temperature cutoff switch (Figure 1, Item 3).

CAUTION

When the following step is being performed, do not force coolant high temperature cutoff switch (Figure 1, Item 3) or cross thread. Failure to observe this caution can result in damage to the engine.

2. Install coolant high temperature cutoff switch (Figure 1, Item 3) onto mounting elbow and hand tighten.
3. Using torque wrench, tighten coolant high temperature cutoff switch (Figure 1, Item 3) to 9~13 ft./lb (12~18 n-m/1.2~1.8 kgf-m).

NOTE

Prior to performing the following step, inspect terminal lugs (Figure 1, Item 4) and terminals for connectivity. Ensure that terminal lug has not become brittle and that there are no nicks, cuts or other damage to terminal lug. If damage is noted, refer to WP 0081 for wiring repairs.

4. Secure two terminal lugs (Figure 1, Item 4) to coolant high temperature cutoff switch (Figure 1, Item 3) with two screws (Figure 1, Item 5).
5. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery and install rear access panel (not shown).
6. Install front access panel (Figure 1, Item 2).
7. Install cargo restraints (not shown).
8. Start Genset (Figure 1, Item 1) in accordance with WP 0005, Genset Start Procedure.

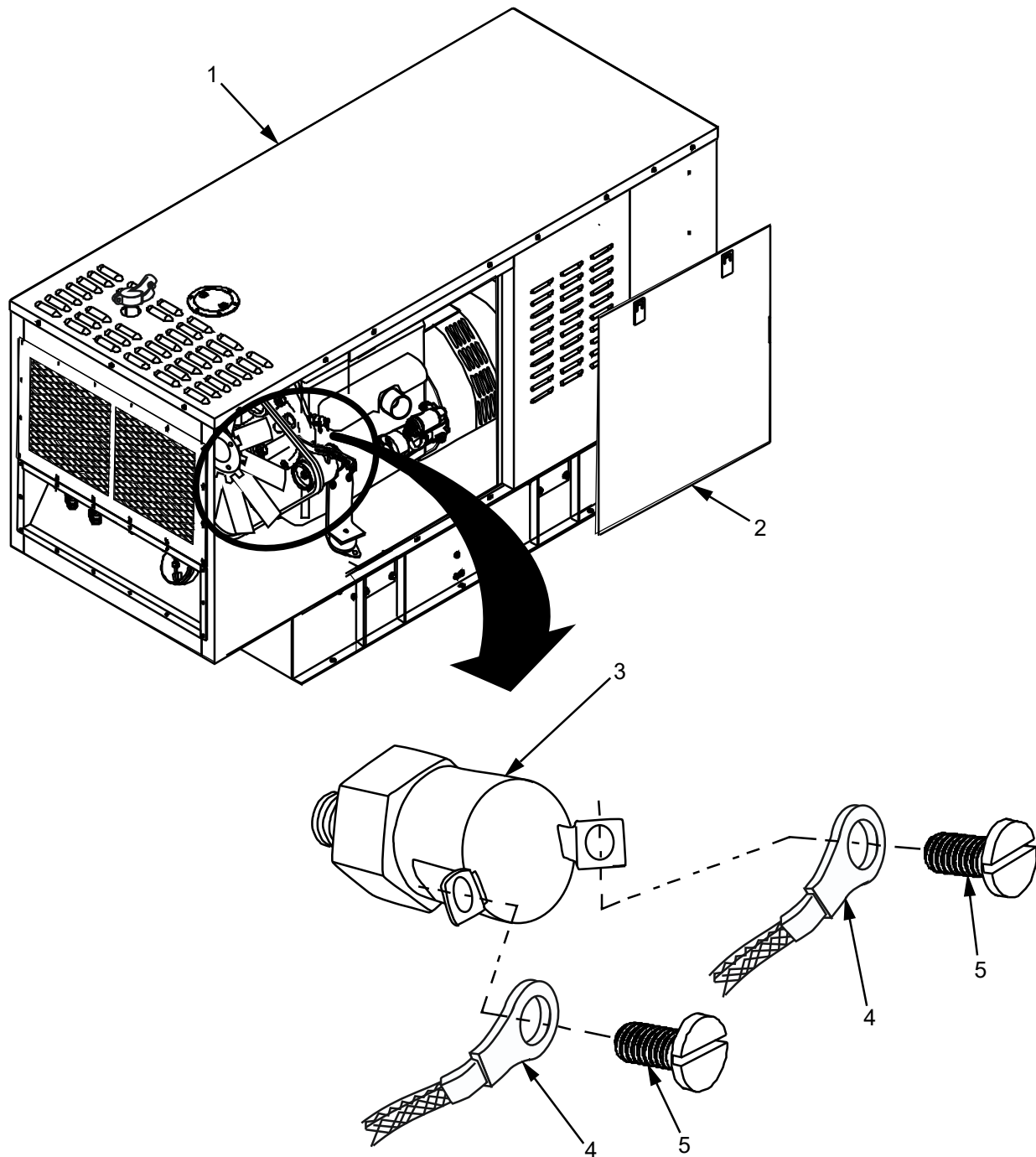


Figure 1. Coolant high temperature cutoff switch- Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET SOLENOID MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset solenoids and associated circuit breaker. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

K2S OR K3S SOLENOID - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

Solenoid

References

WP 0005, WP 0056, WP 0081

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

NOTE

The following procedure is applicable to the K2S and K3S solenoid assemblies associated with the HP-2C/185 UST Trailer Genset.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove access panel(s) (Figure 1, Item 2) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
5. Identify solenoid (Figure 1, Items 3 or 4) to be replaced.

REMOVAL – Continued**NOTE**

If markings on wire(s) and/or solenoid terminal(s) are missing, tag wire(s) and/or solenoid terminal(s) to help with identifying proper connections when replacing solenoid.

6. Remove and retain four nuts (Figure 1, Item 13) and lock washers (Figure 1, Item 12) that secure wire lugs (Figure 1, Items 9 and 11) to solenoid terminals (Figure 1, Item 10). Discard lock washers (Figure 1, Item 12).
7. Disconnect wire lugs (Figure 1, Items 9 and 11) from solenoid terminals (Figure 1, Item 10). Loosely install nuts (Figure 1, Item 13) and new lock washers (Figure 1, Item 12) back onto solenoid terminals (Figure 1, Item 10).
8. Remove and retain two lock nuts (Figure 1, Item 5), bolts (Figure 1, Item 8), and four flat washers (Figure 1, Item 6) that secure solenoid (Figure 1, Items 3 or 4) to mounting bracket (Figure 1, Item 7). Discard lock nuts (Figure 1, Item 5).
9. Remove solenoid (Figure 1, Items 3 or 4) from mounting bracket (Figure 1, Item 7) on Genset.

END OF TASK**REPLACEMENT**

1. Secure solenoid (Figure 1, Items 3 or 4) to mounting bracket (Figure 1, Item 7) on Genset using two new lock nuts (Figure 1, Item 5), bolts (Figure 1, Item 8), and four flat washers (Figure 1, Item 6).

NOTE

Prior to performing the following step, inspect wire lugs (Figure 1, Items 9 and 11) and associated wiring. Ensure that wire has not become brittle and that there are no nicks, cuts or other damage to wire. Inspect solenoid terminals (Figure 1, Item 10), ensure that no damage or corrosion exists. If damage is found, refer to WP 0081 for wiring repairs.

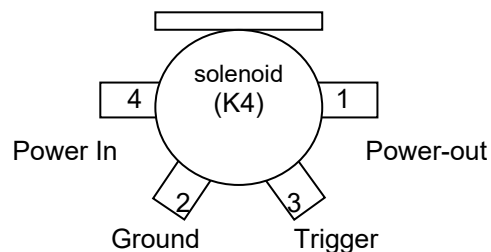
2. Connect wire lugs (Figure 1, Items 9 and 11) to solenoid terminals (Figure 1, Item 10). Secure using four nuts (Figure 1, Item 13) and new lock washers (Figure 1, Item 12). See Table 1.
3. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
4. Install access panel(s) (Figure 1, Item 2) and cargo restraints (not shown).

REPLACEMENT - Continued

5. Start Genset in accordance with WP 0005, Genset Start Procedure.

Table 1. Electronic Connections for Genset Solenoids.

Solenoid/location	# of wires	Wire Color	From	Pin #	To
Starter (K2S) Near starter	One	Red	Power-in	1	STR - (Pin # 3)
	Two	Green	Ground	2	EBGL
		Grey		2	K3S - (Pin # 2)
	One	Grey	Trigger	3	CF1 (Pin # 4)
	Three		Power-out	4	Starter (Pin # 2)
		Red	Power-out	4	CF1 (Pin # 1)
		Grey	Power-out	4	K3S - (Pin # 4)
Glow Plug (K3S) Under Starter	One	Grey	Power-in	1	GP
	Two	Grey	Ground	2	K2S - (Pin # 2)
		Green	Ground	2	CF1 - (Pin # 2)
	One	Grey	Trigger	3	CF1 - (Pin # 5)
	Three	Grey	Power-out	4	ALT - Pos
			Power-out	4	Ves Pac -
		Green	Power-out	4	K2S - (Pin # 4)
Fuel Heater (K4S) Near oil filter	One	Red	Power-in	1	CB12
	One	Green	Ground	2	EBGL
	One	Grey	Trigger	3	CF1 - (Pin # 24)
	One	Red	Power-out	4	FLH - (Pin # 2)



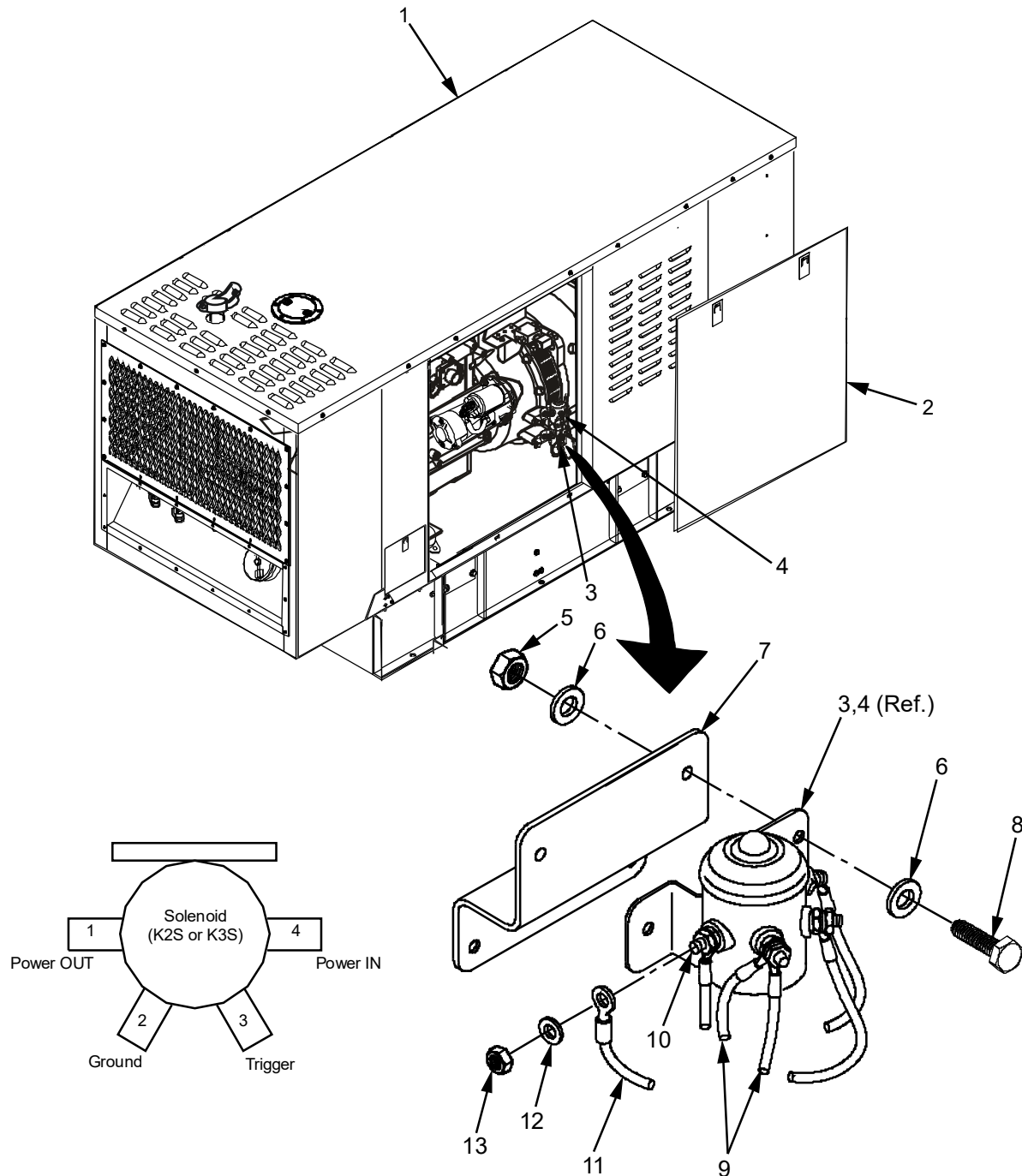


Figure 1. K2S or K3S Solenoid - Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET COOLANT TEMPERATURE SENSOR MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the engine coolant temperature sensor (CTS) and the engine thermostat.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

COOLANT TEMPERATURE SENSOR (CTS) - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Temperature coolant sensor
Tape, Antisiezing (WP 0180, Table 1, Item 45)

References

WP 0005, WP 0056, WP 0070
WP 0081

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Engine coolant temperature sensor is located on the front of the engine in the thermostat housing.

REMOVAL

1. Verify that Genset (Figure 1, Item 17) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF WP 0005, Genset Shut Down Procedure.
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 8 and 18) on Genset (Figure 1, Item 17) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

REMOVAL – Continued**NOTE**

Steps 5 and 6 are optional.

5. Loosen but do not remove nut (Figure 1, Item 4) and bolt (Figure 1, Item 2) that secures exhaust pipe cap. Remove exhaust pipe cap (Figure 1, Item 3) and set aside.
6. Remove and retain 20 bolts (Figure 1, Item 7), lock washers (Figure 1, Item 6), and flat washers (Figure 1, Item 5) that secure top access panel (Figure 1, Item 1) to Genset (Figure 1, Item 17). Remove top access panel (Figure 1, Item 1) and set aside. Discard lock washers (Figure 1, Item 6).
7. Drain engine coolant as described in WP 0070.

NOTE

Place towels or pads below radiator to absorb any excess fluid.

8. Remove nut (Figure 1, Item 13), lock washer (Figure 1, Item 12), and flat washer (Figure 1, Item 14) securing wire lug (Figure 1, Item 11) to coolant temperature sensor (Figure 1, Item 10). Mark and disconnect wire lug (Figure 1, Item 11).

NOTE

When performing the following step, use a second wrench to keep mounting nut (Figure 1, Item 16) from turning.

When performing the following step, be cautious of items surrounding coolant temperature sensor (Figure 1, Item 10).

9. Remove coolant temperature sensor (Figure 1, Item 10) with Insulation washer (Figure 1, Item 15) from mounting nut (Figure 1, Item 16) on thermostat housing (Figure 1, Item 9). Discard coolant temperature sensor (Figure 1, Item 10) and associated hardware.

END OF TASK**REPLACEMENT**

1. Apply Tape, Antisiezing to threads of coolant temperature sensor (Figure 1, Item 10).

CAUTION

When the following step is being performed, do not force coolant temperature sensor or cross thread. Failure to observe this caution can result in damage to the engine.

NOTE

When performing the following step, use a second wrench to keep mounting nut (Figure 1, Item 16) from turning.

2. Install coolant temperature sensor (Figure 1, Item 10) onto mounting nut (Figure 1, Item 16) on thermostat housing (Figure 1, Item 9) and tighten.

REPLACEMENT – Continued

3. Using torque wrench, tighten coolant temperature sensor (Figure 1, Item 10) on thermostat housing (Figure 1, Item 9) to 9~13 ft./lb (12~18 n-m/1.2~1.8 kgf-m).

NOTE

Prior to performing the following step, inspect wire lug (Figure 1, Item 11) and terminal for connectivity. Ensure that wire lug has not become brittle and that there are no nicks, cuts or other damage to wire lug. If damage is found, refer to WP 0081 for wiring repairs.

4. Install Insulation washer (Figure 1, Item 15) and wire lug (Figure 1, Item 11) onto coolant temperature sensor (Figure 1, Item 10) and secure with nut (Figure 1, Item 13), lock washer (Figure 1, Item 12), and flat washer (Figure 1, Item 14).
5. Refill engine coolant as described in WP 0070.
6. Install top access panel (Figure 1, Item 1) onto Genset (Figure 1, Item 17) and secure using 20 bolts (Figure 1, Item 7), new lock washers (Figure 1, Item 6) and flat washers (Figure 1, Item 5).
7. Install exhaust pipe cap (Figure 1, Item 3) and tighten nut (Figure 1, Item 4) and bolt (Figure 1, Item 2) that secure exhaust pipe cap (Figure 1, Item 3).
8. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
9. Replace front and rear access panels (Figure 1, Items 8 and 18) on Genset (Figure 1, Item 17).
10. Install cargo restraints (not shown).
11. Start Genset in accordance with WP 0005, Genset Start Procedure.

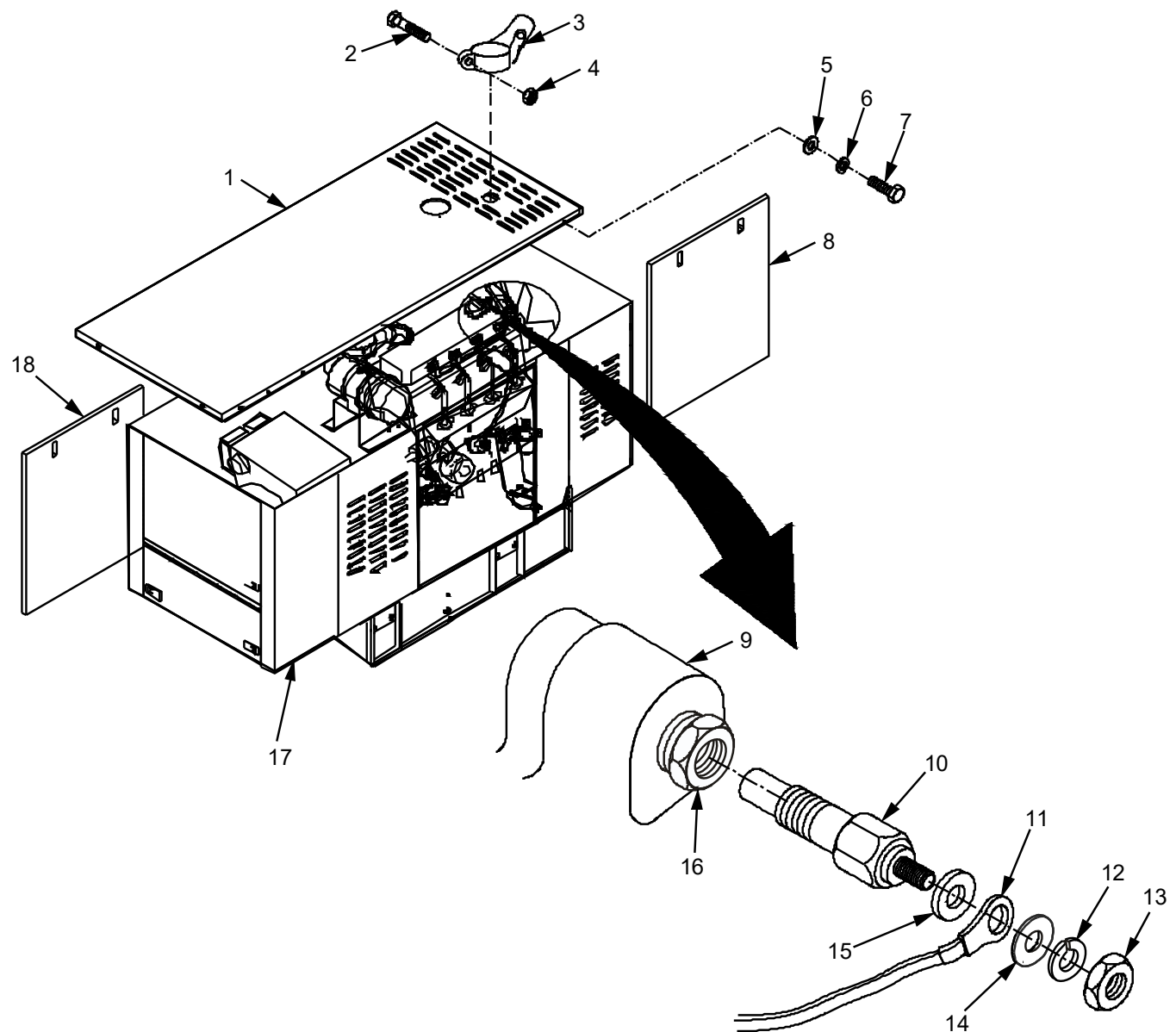


Figure 1. Coolant Temperature Sensor - Replace.

END OF TASK

THERMOSTAT - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Thermostat
Gasket
Cloth, Abrasive (waterproof) (WP 0180, Table 1, tem 11)
Cloth, cleaning (WP 0180, Table 1, Item 12)
Silicone Sealant, RTV (WP 0180, Table 1, Item 39)
Paper, Abrasive, (220 grit) (WP 0180, Table 1, Item 31)

References

WP 0005, WP 0056, WP 0081

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in a operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 2, Item 16) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF WP 0005, Genset Shut Down Procedure.
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 2, Items 5 and 17) on Genset (Figure 1, Item 16) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
5. Loosen but do not remove nut (Figure 2, Item 3) and bolt (Figure 2, Item 1) that secures exhaust pipe cap. Remove exhaust pipe cap (Figure 2, Item 2) and set aside.
6. Remove and retain 20 bolts (Figure 2, Item 18), lock washers (Figure 2, Item 19), and flat washers (Figure 2, Item 20) that secure top access panel (Figure 2, Item 4) to Genset (Figure 2, Item 16). Remove top access panel (Figure 2, Item 4) and set aside. Discard lock washers (Figure 2, Item 19).

REMOVAL – Continued**NOTE**

Place towels or pads below radiator to absorb any excess fluid.

7. Loosen clamp (Figure 2, Item 10) and remove coolant hose (Figure 1, Item 11) from thermostat housing (Figure 2, Item 8).
8. Remove and retain nut (Figure 2, Item 15) and washer (Figure 2, Item 14) that secures wire lug (Figure 2, Item 6) to thermostat housing (Figure 2, Item 8).
9. Remove and retain two bolts (Figure 2, Item 7) that secure thermostat housing (Figure 2, Item 8) to water pump (Figure 2, Item 13).
10. Remove and retain thermostat housing (Figure 2, Item 8) from water pump housing (Figure 2, Item 13).
11. Tap on thermostat (Figure 2, Item 12) to break seal and remove thermostat (Figure 2, Item 12).
12. Remove gasket (Figure 2, Item 9) from thermostat (Figure 2, Item 12) and water pump housing (Figure 2, Item 13).

END OF TASK**REPLACEMENT****CAUTION**

When performing the following step, do not damage the water pump or thermostat housing.

1. Scrape off old gasket material from thermostat housing and water pump housing. If necessary, clean area with Paper, Abrasive (220 grit) or Cloth, Abrasive (waterproof) to remove all residue.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

2. Place thin layer of Silicone Sealant, RTV to top and bottom of new gasket (Figure 2, Item 9) to hold in place during assembly.
3. Install new gasket (Figure 2, Item 9) onto water pump housing (Figure 2, Item 13).
4. Install thermostat (Figure 2, Item 12) and thermostat housing (Figure 2, Item 8) onto water pump housing (Figure 2, Item 13).
5. Secure thermostat housing (Figure 2, Item 8) to water pump housing (Figure 2, Item 13) using two bolts (Figure 2, Item 7).
6. Using torque wrench, tighten two bolts (Figure 2, Item 7) on thermostat housing (Figure 2, Item 8) to 14~21 ft./lb (19~28 n-m/1.9~2.9 kgf-m).

REPLACEMENT - Continued**NOTE**

Prior to performing the following step: inspect coolant hose for cracks, swelling, or other obvious deterioration. Inspect clamp, verify that no damage, corrosion or other obvious deterioration is present.

7. Install coolant hose (Figure 2, Item 11) onto thermostat housing (Figure 2, Item 8) and tighten clamp (Figure 2, Item 10).

NOTE

Prior to performing the following step, inspect wire and terminal for connectivity. Ensure that wires have not become brittle and that there are no nicks, cuts or other damage to wire. If damage is found, refer to WP 0081 for wiring repairs.

8. Connect wire lug (Figure 2, Item 6) to thermostat housing (Figure 2, Item 8) secure with nut (Figure 2, Item 15) and washer (Figure 2, Item 14).
9. Install top access panel (Figure 2, Item 4) onto Genset (Figure 1, Item 16) and secure using 20 bolts (Figure 2, Item 18), new lock washers (Figure 2, Item 19) and flat washers (Figure 2, Item 20).
10. Install exhaust pipe cap (Figure 2, Item 2) and tighten nut (Figure 2, Item 3) and bolt (Figure 2, Item 1) that secure exhaust pipe cap (Figure 2, Item 2).
11. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
12. Replace front and rear access panels (Figure 2, Items 5 and 17) on Genset (Figure 2, Item 16).
13. Start Genset in accordance with WP 0005, Genset Start Procedure.

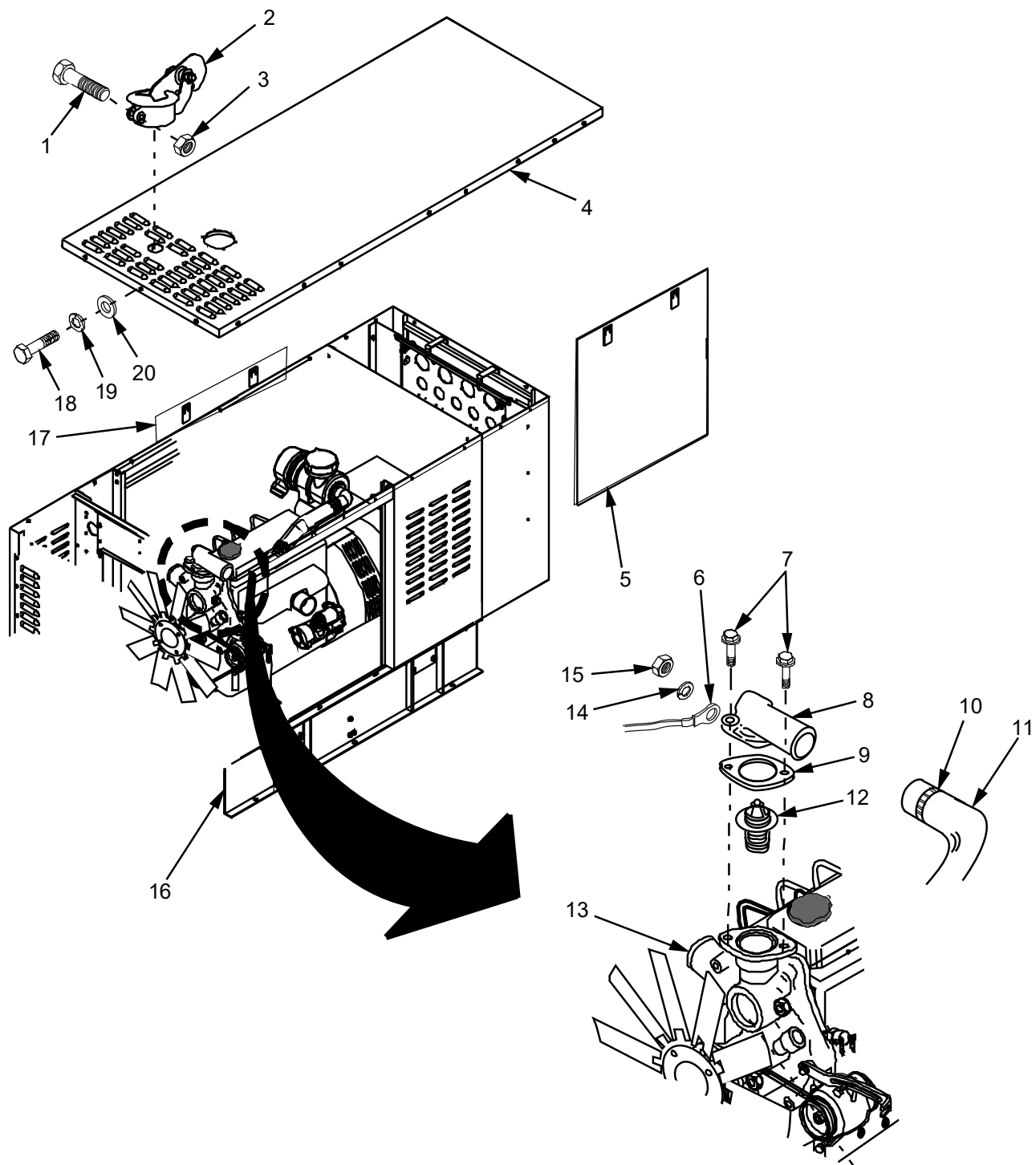


Figure 2. Thermostat - Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET ENGINE COOLANT MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the service of engine coolant in the Genset engine. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

ENGINE COOLANT - SERVICE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)
Drain pan

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Anti-Freeze (WP 0180, Table 1, Item 2)
Cloth, cleaning (WP 0180, Table 1, Item 12)
Tape, Antisiezing (WP 0180, Table 1, Item 45)

References

WP 0005

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 6) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 1 and 5) on Genset (Figure 1, Item 6) and set aside.

NOTE

Coolant drain plug (Figure 1, Item 7) is located on the front base of the Genset enclosure.

4. Place drain pan under coolant drain plug (Figure 1, Item 7). Remove and retain coolant drain plug (Figure 1, Item 7).
5. Insert one end of a drain hose into the engine coolant outlet and place opposite end in drain pan. Use of a drain hose will reduce spillage.

REMOVAL – Continued**NOTE**

Collect coolant in an appropriate chemical-resistant container for disposal through the local servicing Defense Reutilization and Marketing Office.

6. Open coolant drain valves (Figure 1, Item 8 and 9) inside Genset enclosure. Allow coolant to drain into drain pan.

WARNING

Do not remove radiator cap until coolant temperature is below its boiling point (see Table 1). Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

7. Once flow of coolant starts to slow, remove radiator cap (Figure 1, Item 2).
8. Loosen clamp (Figure 1, Item 4), remove coolant reservoir bottle (Figure 1, Item 3) and dump contents into drain pan. Rinse coolant reservoir bottle (Figure 1, Item 3) with clean water.

END OF TASK**REPLACEMENT**

1. Return coolant reservoir bottle (Figure 1, Item 3) to holder and secure with clamp (Figure 1, Item 4).
2. Close coolant drain valves (Figure 1, Items 8 and 9).
3. Remove drain hose and return to storage.
4. Wrap coolant drain plug threads (Figure 1, Item 7) with Tape, Antisiezing, install, and tighten.

NOTE

Prior to performing the following step:

- Inspect radiator for dents, holes, or leaks.
 - Inspect radiator hoses for cracks, swelling, or other obvious deterioration.
 - Inspect hose clamps. Verify that clamps are secure and that no damage or other obvious deterioration is present.
5. Place funnel into radiator fill opening under radiator cap (Figure 1, Item 2) through access hole on top of the Genset.
 6. Add proper coolant/water mix (see Table 1) as necessary to bring the radiator to proper level. Replace the radiator cap (Figure 1, Item 2) and tighten.
 7. Add coolant mix as necessary to bring the coolant reservoir bottle (Figure 1, Item 3) 1/3 to 1/2 full.
 8. Install reservoir bottle cap and tighten.
 9. Start Genset in accordance with WP 0005, Genset Start Procedure. Run for 15 minutes until operational temperature.
 10. Shut down Genset (Figure 1, Item 6) in accordance with WP 0005, Genset Stop Procedure.

REPLACEMENT - Continued**WARNING**

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

11. Check Genset coolant levels. Coolant should be one inch below the overflow level. Bottle should be 1/3 to 1/2 full when cool. If levels do not meet these requirements repeat steps 5 through 7 until levels are reached.
12. Replace front and rear access panels (Figure 1, Items 1 and 5) on Genset (Figure 1, Item 6).
13. Install cargo restraints (not shown) to rear of Genset.
14. Start Genset in accordance with Genset Start Procedure (WP 0005).

NOTE

Table 1. Radiator Coolant to Water Ratios.

Conditions	Coolant (by volume)	Water (by volume)	Freezing point	Boiling point
Normal	40%	60%	-10°F (-23.33°C)	260°F (126.66°C)
	50%	50%	-34°F(-36.66°C)	265°F (129.44°C)
Arctic	60%	40%	-62°F (-52.22°C)	270°F (132.22°C)

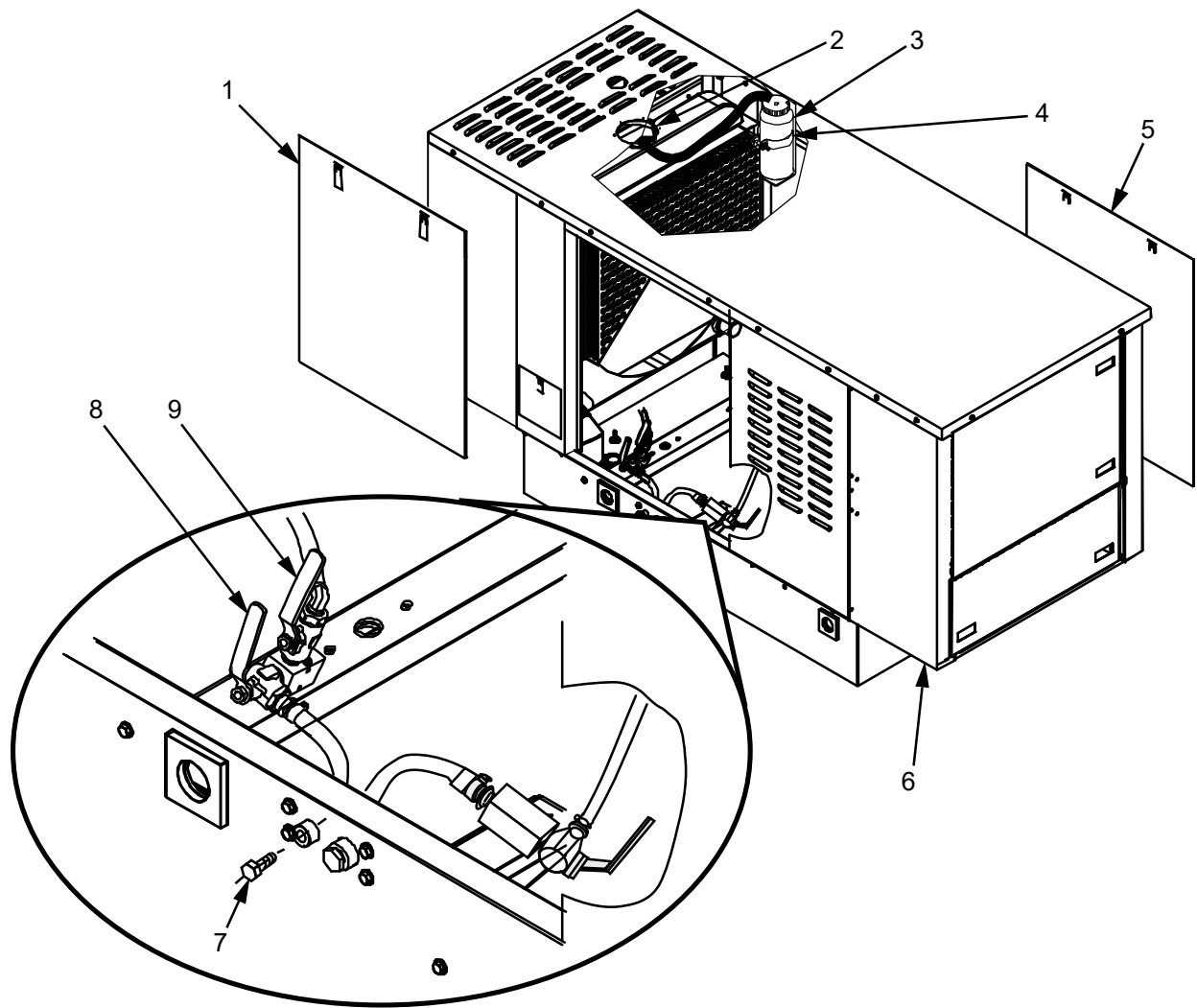


Figure 1. Engine Coolant - Service.

END OF TASK

ENGINE COOLANT RESERVOIR BOTTLE - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)
Drain pan

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Coolant bottle
Cloth, cleaning (WP 0180, Table 1, Item 12)
Anti-Freeze (WP 0180, Table 1, Item 2)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 2, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove the rear access panel (Figure 2, Item 2) on Genset (Figure 2, Item 1) and set aside.
3. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
4. Disconnect overflow tube (Figure 2, Item 7) from coolant reservoir bottle (Figure 2, Item 3).
5. Loosen, but do not remove, bolt (Figure 2, Item 4), nut (Figure 2, Item 6), and two flat washers (Figure 2, Item 5).
6. Remove coolant reservoir bottle (Figure 2, Item 3) and properly dispose of reservoir bottle (Figure 2, Item 3) and contents.

END OF TASK**REPLACEMENT**

1. Insert coolant reservoir bottle (Figure 2, Item 3) and secure using bolt (Figure 2, Item 4), nut (Figure 2, Item 6), and two flat washers (Figure 2, Item 5).
2. Connect overflow tube (Figure 2, Item 7) to coolant reservoir bottle (Figure 2, Item 3).

REPLACEMENT - Continued

3. Add coolant mix as necessary to bring the coolant reservoir bottle (Figure 2, Item 3) 1/3 to 1/2 full.
4. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
5. Start Genset (Figure 2, Item 1) in accordance with WP 0005, Genset Start Procedure. Run for 15 minutes until operational temperature and observe coolant level in reservoir bottle (Figure 2, Item 3). If necessary add coolant mix.
6. Replace rear access panel (Figure 2, Item 2) on Genset (Figure 2, Item 1).

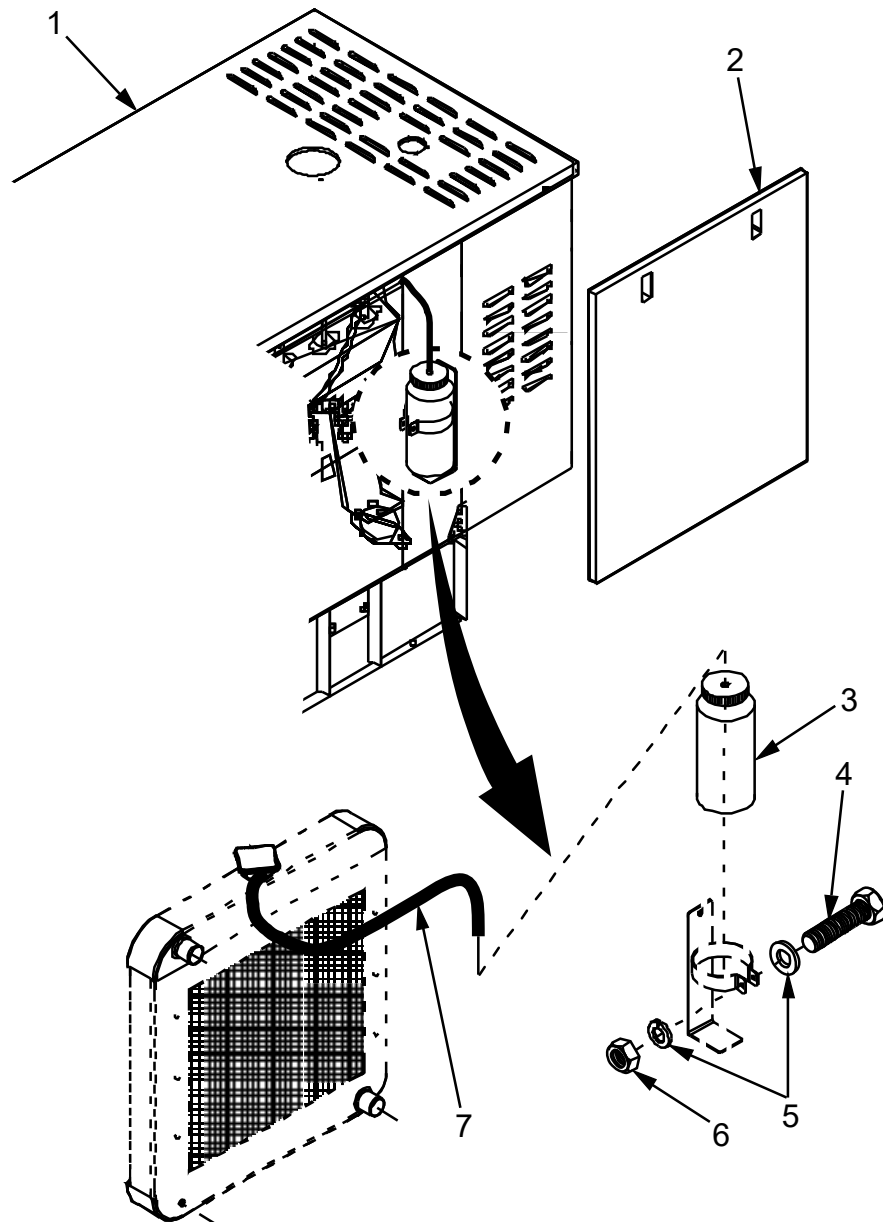


Figure 2. Engine Coolant Reservoir Bottle - Replace.

END OF TASK

ENGINE COOLANT DRAIN VALVE HOUSING - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Drain valve housing
Cloth, cleaning (WP 0180, Table 1, Item 12)
Anti-Freeze (WP 0180, Table 1, Item 2)**References**

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 3, Items 1 and 2) on Genset (Figure 3, Item 3) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
5. Drain coolant as per this WP.
6. Remove and retain two screws (Figure 3, Item 11), lock washers (Figure 3, Item 12), and flat washers (Figure 3, Item 13) that secure valve housing (Figure 3, Item 10). Discard lock washers (Figure 3, Item 12),
7. Remove any cable ties securing hoses (Figure 3, Item 7) together.
8. Loosen but do not remove clamp (Figure 3, Item 8) securing hose (Figure 3, Item 7) to engine block. Remove hose (Figure 3, Item 7) and fitting (Figure 3, Item 9) from valve housing (Figure 3, Item 10).
9. Loosen but do not remove clamp (Figure 3, Item 8) on hose (Figure 3, Item 7) going to coolant drain port. Remove hose (Figure 3, Item 7) from drain valve (Figure 3, Item 5) and remove drain valve (Figure 3, Item 5) from valve housing (Figure 3, Item 10).
10. Remove drain valve (Figure 3, Item 6) from valve housing (Figure 3, Item 10).

END OF TASK**REPLACEMENT**

1. Connect drain valve (Figure 3, Item 6) that comes from the bottom of radiator to valve housing (Figure 3, Item 10).
2. Connect fitting (Figure 3, Item 9) to valve housing (Figure 3, Item 10) and connect hose (Figure 3, Item 7) to fitting, secure in place with clamp (Figure 3, Item 8).
3. Connect drain valve (Figure 3, Item 5), fitting (Figure 3, Item 4), hose (Figure 3, Item 7), and clamp (Figure 3, Item 8) to valve housing (Figure 3 Item 10).

REPLACEMENT - Continued

4. Attach valve housing (Figure 3, Item 10) to enclosure with two screws (Figure 3, Item 11), new lock washers (Figure 3, Item 12), and flat washers (Figure 3, Item 13).
5. Secure any loose, dangling hoses with cable ties.
6. Refill coolant as described in this Work Package and check for any leaks.
7. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
8. Replace the front and rear access panels (Figure 3, Items 1 and 2) on Genset (Figure 3, Item 3).
9. Start Genset (Figure 3, Item 3) in accordance with WP 0005, Genset Start Procedure.

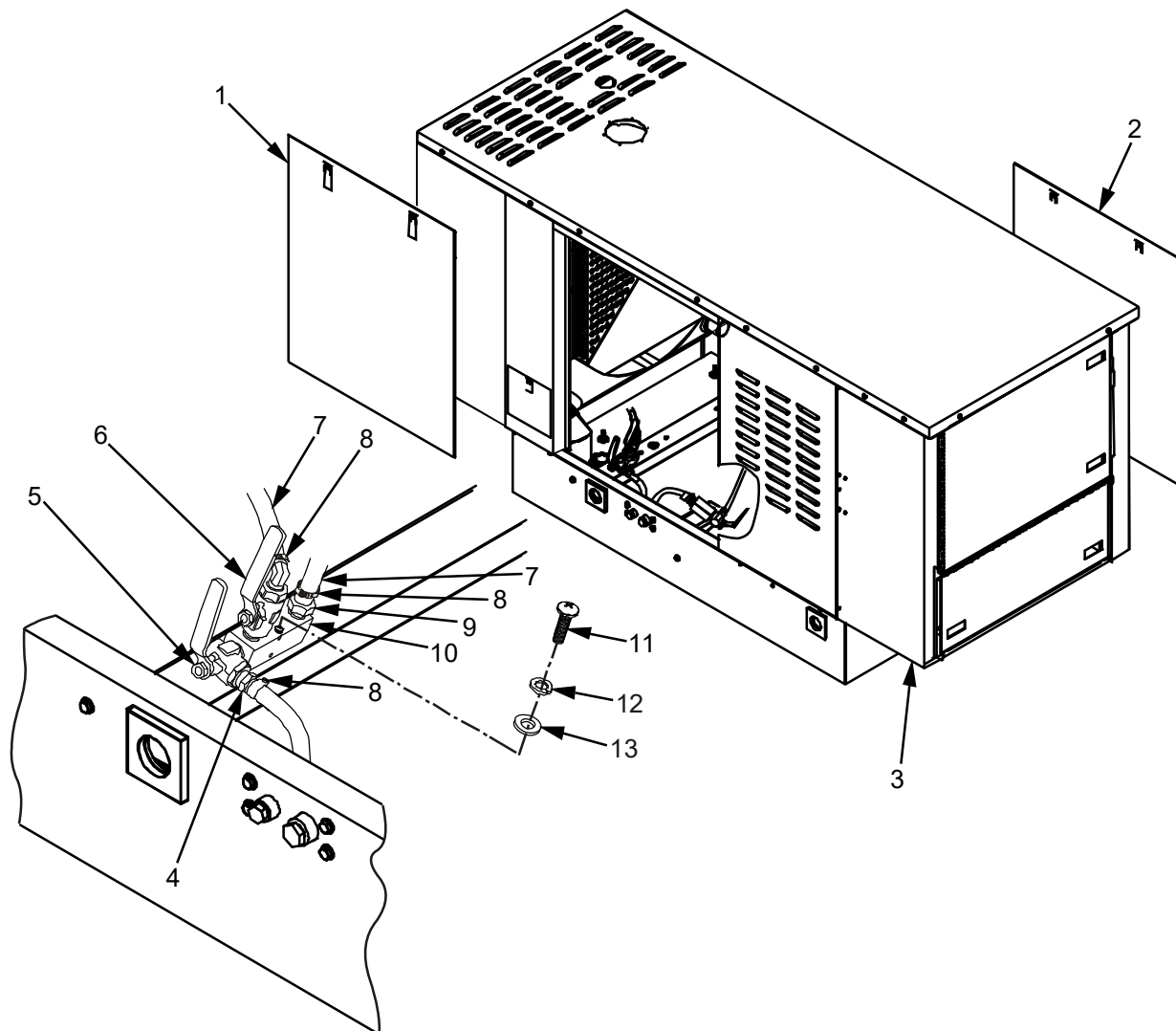


Figure 3. Engine Coolant Drain Valve Housing - Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET RADIATOR MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the Genset radiator, hoses, and clamps. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

RADIATOR, HOSES AND CLAMPS REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)
Drain pan

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Radiator hose(s)
Clamps
Cloth, cleaning (WP 0180, Table 1, Item 14)
Anti-Freeze (WP 0180, Table 1, Item 2)

References

WP 0005, WP 0020, WP 0056
WP 0047, WP 0073

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

HOSE AND CLAMPS**REMOVAL**

1. Verify that Genset (Figure 1, Item 12) has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 14 and 18) on Genset (Figure 1, Item 12) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in WP 0056).

REMOVAL - Continued

5. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secures exhaust pipe cap (Figure 1, Item 2). Remove exhaust pipe cap (Figure 1, Item 2) and set aside.
6. Remove and retain 20 bolts (Figure 1, Item 19) lock washers (Figure 1, Item 20) and flat washers (Figure 1, Item 21) that secures top access panel (Figure 1, Item 22) to Genset (Figure 1, Item 12). Remove top access panel (Figure 1, Item 22) and set aside.
7. Drain coolant from radiator as describe in WP 0047.
8. Loosen hose clamps (Figure 1, Item 9) of radiator hose(s) (Figure 1, Items 8 and 13) to be replaced.

NOTE

Place a drip bucket or absorbent pad under radiator hose(s) to be replaced in case of spillage.

9. Pull radiator hose(s) (Figure 1, Items 8 and 13) away from connection using a twisting motion. Remove radiator hose(s) (Figure 1, Items 8 and 13).
10. Remove and retain hose clamps (Figure 1, Item 9) and discard radiator hose(s) (Figure 1 Items 8 and 13).

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps:

- Inspect radiator for dents, holes, or leaks.
- If re-using radiator hose(s) (Figure 1, Items 8 and 13), inspect for cracks, swelling, or other obvious deterioration.
- If re-using inspect hose clamps (Figure 1, Item 9), verify that no damage or other obvious deterioration is present.

Ensure hose clamps (Figure 1, Item 9) are placed on radiator hoses (Figure 1, Items 8 and 13) so that screws will be accessible after installation.

1. Loosely place hose clamps (Figure 1, Item 9) onto radiator hose(s) (Figure 1, Items 8 and 13) and slide toward center of radiator hose (Figure 1, Items 8 and 13).

NOTE

To ensure a good seal, when the hose clamp (Figure 1, Item 9) is tightened down most radiator connections have a ridge built into them.

2. Install radiator hose(s) (Figure 1, Items 8 and 13) onto radiator and engine connection(s). Ensure radiator hose(s) (Figure 1, Items 8 and 13) are slid back far enough.

CAUTION

Over tightening hose clamps (Figure 1, Item 9) can damage radiator hose(s) (Figure 1, Items 8 and 13) and cause premature failure.

REPLACEMENT – Continued

3. Slide hose clamps (Figure 1, Item 9) into proper positions and tighten hose clamps (Figure 1, Item 9), until hose clamps (Figure 1, Item 9) begin to press into radiator hose(s) (Figure 1, Items 8 and 13).
4. Refill coolant as describe in WP 0047.
5. Install top access panel (Figure 1, Item 22) onto Genset (Figure 1, Item 12) and secure using 20 bolts (Figure 1, Item 19) lock washers (Figure 1, Item 20) and flat washers (Figure 1, Item 21) .
6. Install exhaust pipe cap (Figure 1, Item 2) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secure exhaust pipe cap (Figure 1, Item 2).
7. Connect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in WP 0056) and install rear access panel (Figure 1, Item 18).
8. Start Genset in accordance with Genset Start Procedure (WP 0005). Run for 15 minutes until engine has reached operational temperature.

WARNING

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

9. Check Genset coolant levels. Coolant should be one inch below the overflow level. Bottle should be 1/3 to 1/2 full when cool.
10. Replace front and rear access panels (Figure 1, Items 14 and 18) on Genset (Figure 1, Item 12).
11. Install cargo restraints (not shown) to rear of Genset.
12. Start Genset in accordance with Genset Start Procedure (WP 0005).

END OF TASK**RADIATOR****REMOVAL**

1. Verify that Genset (Figure 1, Item 12) has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 14 and 18) on Genset (Figure 1, Item 12) and set aside.
4. Disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in WP 0056).
5. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secures exhaust pipe cap (Figure 1, Item 2). Remove exhaust pipe cap (Figure 1, Item 2) and set aside.

REMOVAL – Continued

6. Remove and retain 20 bolts (Figure 1, Item 19), lock washers (Figure 1, Item 20) and flat washers (Figure 1, Item 21), that secures top access panel (Figure 1, Item 22) to Genset (Figure 1, Item 12). Remove top access panel (Figure 1, Item 22) and set aside.

WARNING

Do not remove radiator cap or drain until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

7. Drain coolant from radiator (Figure 1, Item 7) as described in WP 0047.
8. Disconnect overflow hose (Figure 1, Item 5) from radiator (Figure 1, Item 7) and move aside.
9. Remove fan and shroud as described in WP 0073.
10. Loosen clamp (Figure 1, Item 10) and disconnect drain hose (Figure 1, Item 11) from radiator (Figure 1, Item 7).
11. Remove clamps (Figure 1, Items 9) and hoses (Figure 1, Items 8 and 13).
12. Remove and retain six bolts (Figure 1, Item 17), lock washers (Figure 1, Item 16) and flat washers (Figure 1, Item 15) that secure radiator (Figure 1, Item 7) to frame (Figure 1, Item 4).
13. Remove radiator (Figure 1, Item 7) from frame (Figure 1, Item 4).

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps:

- Inspect radiator for dents, holes, or leaks.
- If re-using radiator hose(s) (Figure 1, Items 8 and 13), inspect for cracks, swelling, or other obvious deterioration.
- If re-using hose clamps (Figure 1, Item 9), inspect and verify that no damage or other obvious deterioration is present.
- Inspect fan, fan belt, water pump and all other exposed engine parts, verify that no damage or other obvious deterioration is present.

Ensure hose clamps (Figure 1, Item 9) are placed on radiator hoses (Figure 1, Items 8 and 13) so that screws will be accessible after installation.

1. Install radiator (Figure 1, Item 7) and secure to frame (Figure 1, Item 4) using six bolts (Figure 1, Item 17), lock washers (Figure 1, Item 16) and flat washers (Figure 1, Item 15),
2. Connect drain hose (Figure 1, Item 11) to radiator (Figure 1, Item 7) and secure with clamp (Figure 1, Item 10).

REPLACEMENT – Continued

3. Install fan and shroud as described in WP 0073.
4. Connect overflow hose (Figure 1, Item 5) to radiator (Figure 1, Item 7).
5. Install hoses (Figure 1, Items 8 and 13) and clamps (Figure 1, Items 9).
6. Add coolant to radiator (Figure 1, Items 7) as described in WP 0020.
7. Connect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in WP 0056).
8. Install top access panel (Figure 1, Item 22) onto Genset (Figure 1, Item 12) and secure using 20 bolts (Figure 1, Item 19), lock washers (Figure 1, Item 20) and flat washers (Figure 1, Item 21).
9. Install exhaust pipe cap (Figure 1, Item 2) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secure exhaust pipe cap (Figure 1, Item 2).
10. Start Genset (Figure 1, Items 12) in accordance with Genset Start Procedure (WP 0005). Run for 15 minutes until operational temperature.

WARNING

Do not remove radiator cap until coolant temperature is below its boiling point. Radiator can erupt and cause severe burns. Once cooling has occurred, loosen cap slightly to relieve any excess pressure before removing the cap completely. Failure to observe this warning can result in severe injury to personnel.

11. Check Genset coolant levels. Coolant should be one inch below the overflow level. Bottle should be 1/3 to 1/2 when cool.
12. Replace front and rear access panels (Figure 1, Items 14 and 18) on Genset (Figure 1, Item 12).
13. Install cargo restraints (not shown) to rear of Genset.
14. Start Genset in accordance with Genset Start Procedure (WP 0005).

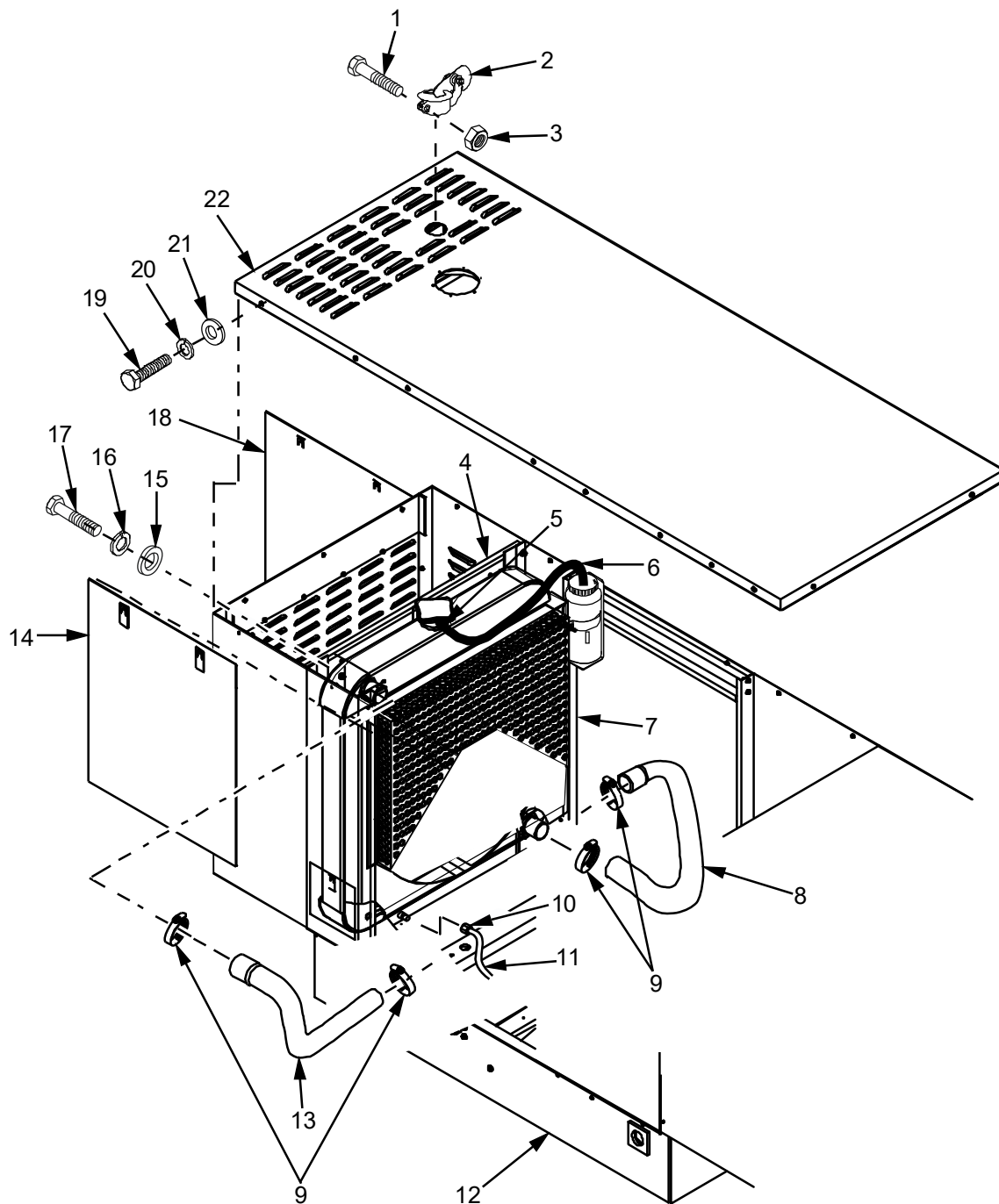


Figure 1. Radiator, Hoses, and Clamps Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

SERVICE MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET ALTERNATOR MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the services, adjustments removal and replacement of the Genset alternator.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

ALTERNATOR REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

Alternator

References

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset (Figure 1, Item 1).
3. Remove the front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1) and set aside.
4. Remove rear access panel (not shown) and disconnect battery ground cable (black) from battery ground terminal (If necessary, refer to procedure in WP 0056).
5. Loosen but do not remove bottom mounting bolt (Figure 1, Item 12) and nut (Figure 1, Item 10).
6. Loosen but do not remove alignment bolt (Figure 1, Item 14) on alternator bracket (Figure 1, Item 15).
7. Loosen but do not remove hinge bolt (Figure 1, Item 16) on alternator bracket (Figure 1, Item 15).
8. Push alternator (Figure 1, Item 11) towards engine and loosen fan belt (Figure 1, Item 13).
9. Remove and retain nut (Figure 1, Item 3), lock washer (Figure 1, Item 4) and wire (Figure 1, Item 5) from main output stud on alternator (Figure 1, Item 11). Re-install nut (Figure 1, Item 3), lock washer (Figure 1, Item 4).
10. Disconnect wire terminal (Figure 1, Item 9) from alternator (Figure 1, Item 11).

REMOVAL – Continued

11. Remove and retain nut (Figure 1, Item 6), lock washer (Figure 1, Item 7) and ground wire (Figure 1, Item 8) from ground stud on alternator (Figure 1, Item 11). Re-install nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7).
12. Remove and retain bottom mounting bolt (Figure 1, Item 12) and nut (Figure 1, Item 10).
13. Remove and retain top mounting bolt (Figure 1, Item 14).
14. Remove alternator (Figure 1, Item 11) from guides in the engine block.

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following step, inspect ground wire (Figure 1, Item 8) wire terminal (Figure 1, Item 9), and wire (Figure 1, Item 5) for connectivity. Ensure that wires have not become brittle and that there are no nicks, cuts or other damage to wire.

1. Insert alternator (Figure 1, Item 11) onto guides in the engine block.
2. Align bottom bolt hole of alternator (Figure 1, Item 11) with corresponding hole on engine block.
3. Insert bottom mounting bolt (Figure 1, Item 12) and nut (Figure 1, Item 10) and tighten until touching engine mount. Leave slack in bolt to allow movement.
4. Rotate alternator (Figure 1, Item 11) into the up position. Align bolt hole with groove in adjusting slide.
5. Insert alignment bolt (Figure 1, Item 14) through adjusting groove and alternator. Finger tighten.

NOTE

Fan belt should have no more than 0.3~0.33 in. (7.5~8.5 mm) of play when flexed on longest side.

6. Install fan belt (Figure 1, Item 13) and perform adjustment procedure.
7. Using torque wrench, tighten bottom mounting bolt (Figure 1, Item 12) and nut (Figure 1, Item 10), alignment bolt (Figure 1, Item 14) to 14~21 ft./lb (19~28 n-m/1.9~2.9 kgf-m).
8. Using torque wrench, tighten alternator bracket hinge bolt (Figure 1, Item 16) to 25~34 ft./lb (34~46 n-m/3.5~4.7 kgf-m).
9. Connect ground wire (Figure 1, Item 8) (green with looped connector) to ground stud on alternator (Figure 1, Item 11) and secure with nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7).
10. Connect wire (Figure 1, Item 5) (loop connector) to main output stud on alternator (Figure 1, Item 11) and secure with nut (Figure 1, Item 3) and lock washer (Figure 1, Item 4).
11. Connect wire terminal (Figure 1, Item 9) to alternator (Figure 1, Item 11).

REPLACEMENT - Continued

12. Connect battery ground cable (black) to battery ground terminal (If necessary, refer to procedure in WP 0056) and install rear access panel (not shown).
13. Install front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1) and set aside.
14. Install cargo restraints (not shown).
15. Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005).

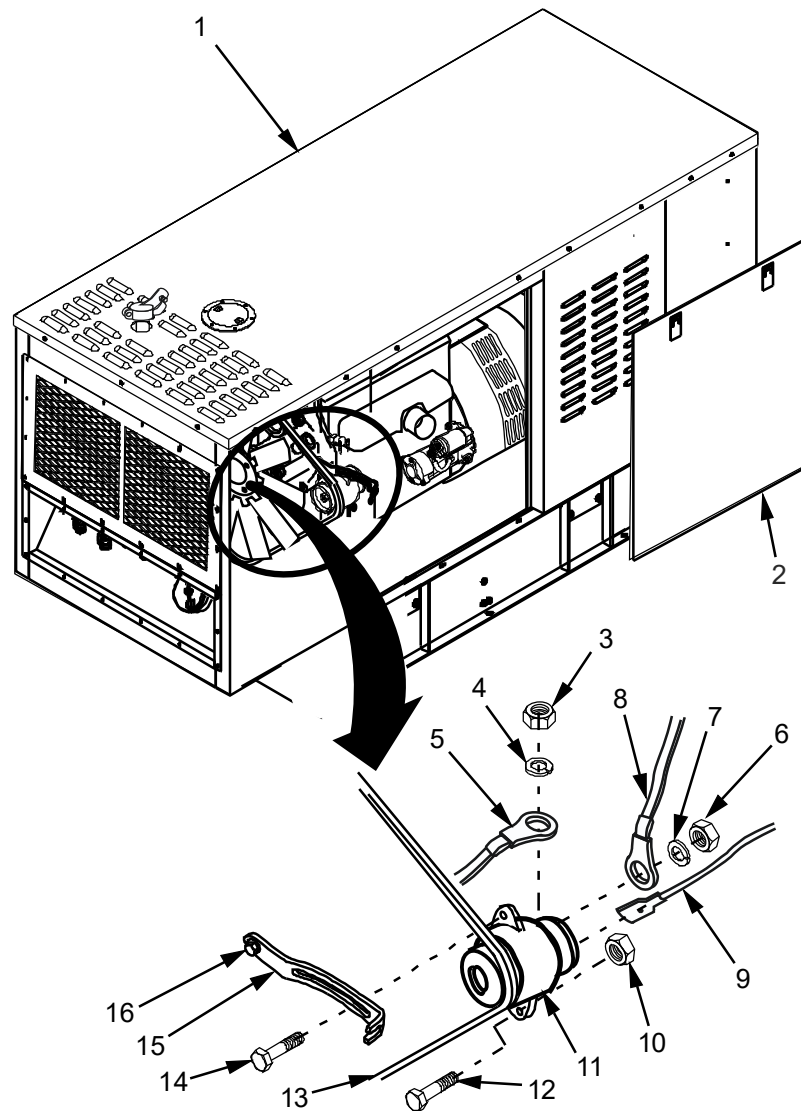


Figure 1. Alternator Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET FAN BELT MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the inspection of the Genset fan belt. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

WARNING

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

FAN BELT - INSPECT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

Fan belt

References

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

INSPECTION

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove the front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1) and set aside.
3. Inspect fan belt (Figure 1, Item 11) for excessive wear, nicks, cuts or other visible damage. Fan belt should be flush with pulleys on water pump and alternator (Figure 1, Item 8). If fan belt is not flush with top of groove in each pulley, replace fan belt.
4. Check fan belt for deflection. When flexed, no more than 0.3~0.33 in (7.5 mm ~8.5 mm) deflection on longest side of engine fan belt (Figure 1, Item 11) should be present.
5. Replace front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1).
6. Start Genset (Figure 1, Item 1) in accordance with WP 0005, Genset Start Procedure.

END OF TASK**ADJUSTMENT**

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove the front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1) and set aside.

ADJUSTMENT – Continued

3. Loosen but do not remove bottom mounting bolt (Figure 1, Item 10) and nut (Figure 1, Item 9) of alternator (Figure 1, Item 8).
4. Loosen but do not remove adjustment bolt (Figure 1, Item 7) on alternator bracket (Figure 1, Item 6).

CAUTION

Do not over tighten fan belt. This could cause undue stress and excessive wear on fan belt, alternator, and pulley. When flexed, no more than 0.3~0.33 in (7.5 mm ~8.5 mm) deflection on longest side of engine fan belt (Figure 1, Item 11) should be present.

5. Tighten fan belt (Figure 1, Item 11) as follows:
 - a. Place pry bar between the alternator (Figure 1, Item 8) and water pump (Figure 1, Item 3).
 - b. Apply a downward force (towards alternator) on the pry bar to achieve proper tension on fan belt.

NOTE

Keep tension on alternator (Figure 1, Item 8) with pry bar while performing the following two steps.

6. Tighten adjustment bolt (Figure 1, Item 7) on alternator bracket (Figure 1, Item 6).
7. Tighten bottom mounting bolt (Figure 1, Item 10) and nut (Figure 1, Item 9) of alternator (Figure 1, Item 8).
8. Replace front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1).
9. Start Genset (Figure 1, Item 1) in accordance with WP 0005, Genset Start Procedure.

END OF TASK**REMOVAL**

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove the front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1) and set aside.
3. Remove rear access panel (not shown) and disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
4. Loosen but do not remove bottom mounting bolt (Figure 1, Item 10) and nut (Figure 1, Item 9) of alternator (Figure 1, Item 8).
5. Loosen but do not remove adjustment bolt (Figure 1, Item 7) on alternator bracket (Figure 1, Item 6).
6. Push alternator (Figure 1, Item 8) towards engine to loosen fan belt (Figure 1, Item 11).

REMOVAL – Continued

7. Remove fan belt (Figure 1, Item 11) from alternator pulley (Figure 1, Item 8), crank shaft pulley (Figure 1, Item 4), water pump pulley (Figure 1, Item 3), and place onto fan neck.
8. Push fan belt (Figure 1, Item 11) into fan shroud and slide fan belt (Figure 1, Item 11) under lowest fan blade.
9. Rotate the fan blades (Figure 1, Item 5), sliding fan belt (Figure 1, Item 11) under each fan blade (Figure 1, Item 5) until fan belt (Figure 1, Item 11) is released.

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps:

- Inspect radiator for dents, holes, or leaks.
 - Inspect water pump (Figure 1, Item 3), crank shaft pulley (Figure 1, Item 4) and alternator (Figure 1, Item 8).
 - Inspect fan blade assembly for damage corrosion or other signs that would indicate replacement is necessary.
1. Insert new fan belt (Figure 1, Item 11) into fan shroud to allow fan belt (Figure 1, Item 11) to fit over fan blade.
 2. While rotating fan blades (Figure 1, Item 5), slide fan belt (Figure 1, Item 11) under fan blades (Figure 1, Item 5) until fan belt (Figure 1, Item 11) is around fan neck.
 3. Mount fan belt (Figure 1, Item 11) onto grooves of water pump (Figure 1, Item 3) and crank shaft pulley (Figure 1, Item 4).
 4. Mount fan belt (Figure 1, Item 11) onto alternator pulley (Figure 1, Item 8).

CAUTION

Do not over tighten fan belt. This could cause undue stress and excessive wear on fan belt, alternator, and pulley. Fan belt should have no more than 0.3~0.33 in. (7.5~8.5 mm) of play when flexed on longest side.

5. Perform adjustment procedure as described in this WP.
6. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery and install rear access panel (not shown).
7. Replace front access panel (Figure 1, Item 2) on Genset (Figure 1, Item 1).
8. Install cargo restraints (not shown) to rear of Genset.
9. Start Genset (Figure 1, Item 1) in accordance with WP 0005, Genset Start Procedure.

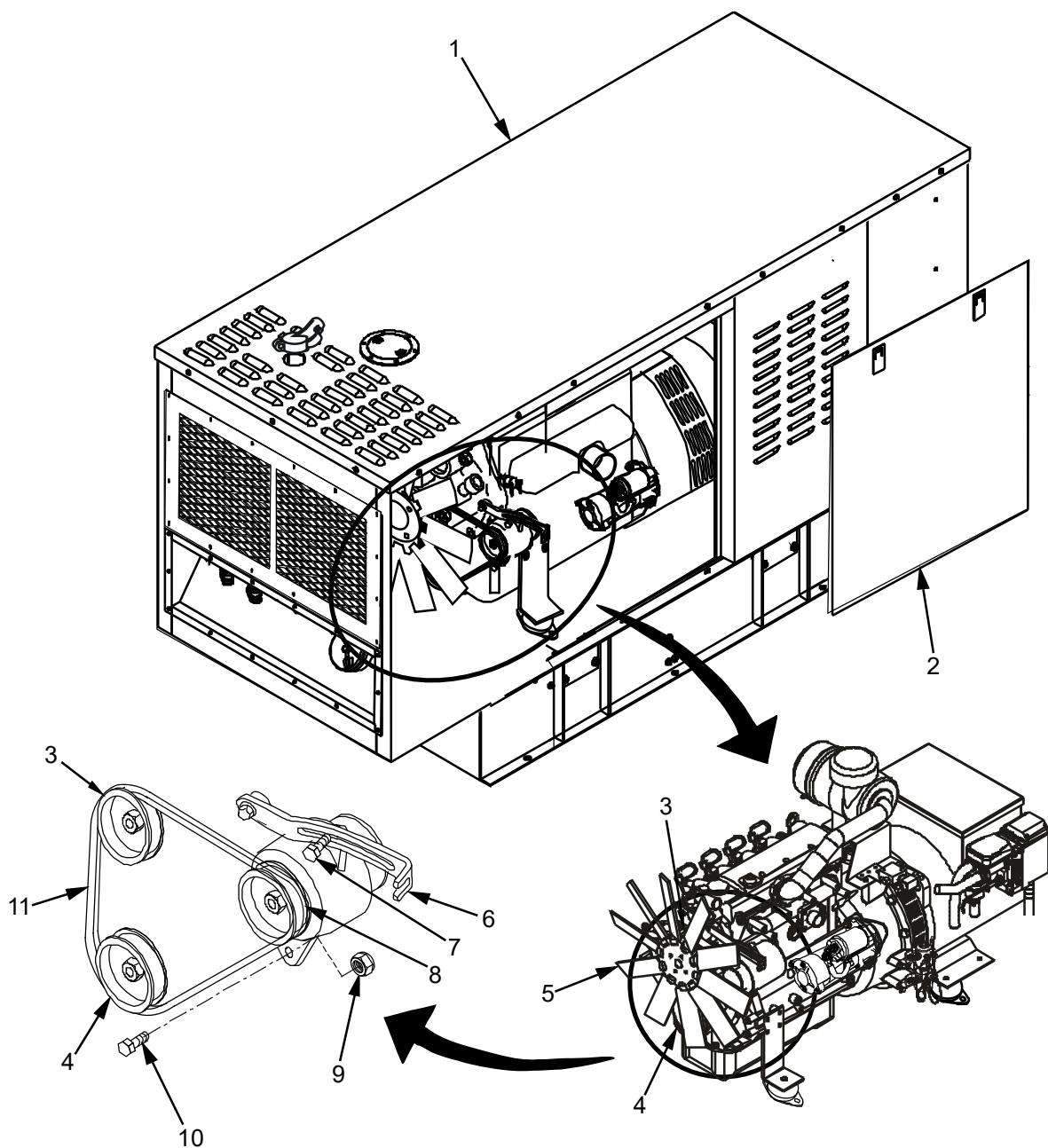


Figure 1. Fan Belt - Inspect.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET FAN MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset fan. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

FAN - REPLACE

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set, (WP 0132, Table 2, Item 4)
Drain pan

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Fan
Sealing compound (WP 0180, Table 1, Item 37)
Anti-Freeze (WP 0180, Table 1, Item 2)
Strap ties (WP 0180, Table 1, Item 42 to 44)
Cloth, cleaning (WP 0180, Table 1, Item 12)

References

WP 0005, WP 0056, WP 0058,
WP 0070, WP 0071, WP 0072

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Start Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 2 and 10) on Genset and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
5. Loosen but do not remove nut (Figure 1, Item 5) and bolt (Figure 1, Item 3) that secure exhaust pipe cap (Figure 1, Item 4). Remove exhaust pipe cap (Figure 1, Item 4) and set aside.
6. Remove and retain 20 bolts (Figure 1, Item 8) lock washers (Figure 1, Item 7) and flat washers (Figure 1, Item 6) that secure top access panel (Figure 1, Item 9) to Genset. Remove top access panel and set aside. Discard lock washers (Figure 1, Item 7).
7. Drain coolant from radiator as described in WP 0058.

REMOVAL – Continued**NOTE**

Place towels or pads below radiator to absorb any excess fluid.

8. Remove upper radiator hose as described in WP 0070.
9. Remove strap ties that secure radiator over flow tube (Figure 1, Item 11) to fan shroud (Figure 1, Item 13).
10. Remove radiator overflow tube (Figure 1, Item 11) from below radiator cap (Figure 1, Item 12) and set aside.
11. Remove and retain eight bolts (Figure 1, Item 14) that secure fan shroud and slide fan shroud back to give access to the engine fan (Figure 1, Item 21).

NOTE

If necessary, loosen alternator (Figure 1, Item 15) and release tension on fan belt (Figure 1, Item 16) as described in WP 0071.

12. Remove and retain four bolts (Figure 1, Item 22) that secure engine fan (Figure 1, Item 21) and spacers (Figure 1, Items 19 & 20) to pulley assembly (Figure 1, Item 17).
13. Remove engine fan (Figure 1, Item 21), fan shroud (Figure 1, Item 13) and spacers (Figure 1, Items 19 & 20).
14. If removing water pump, remove bolts (Figure 1, Item 18) and pulley assembly (Figure 1, Item 17).

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following step:

- Inspect radiator for dents, holes, or leaks.
- Inspect radiator hoses for cracks, swelling, or other obvious deterioration.
- Inspect hose clamps. Verify that clamps are secure and that no damage or other obvious deterioration is present.

If pulley assembly (Figure 1, Item 17) was removed from water pump, replace pulley assembly and secure with bolts (Figure 1, Items 18) tighten to 17.4 ft./lb (23.5 n-m/2.4 kgf-m).

1. Install engine fan (Figure 1, Item 21) and spacers (Figure 1, Items 19 & 20) onto pulley assembly (Figure 1, Item 17).

REPLACEMENT – Continued**WARNING**

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors, and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

2. Apply sealing compound to four bolts (Figure 1, Item 22). Secure engine fan and spacers to pulley assembly with four bolts (Figure 1, Item 22).
3. Using torque wrench, tighten four bolts (Figure 1, Item 22) of engine fan to 17.4 ft./lb (23.5 n-m/2.4 kgf-m).
4. Install outer fan shroud (Figure 1, Item 13) and secure to radiator with eight bolts (Figure 1, Item 14).
5. Install radiator overflow tube (Figure 1, Item 11) below radiator cap (Figure 1, Item 12). Attach radiator overflow tube (Figure 1, Item 11) to outer fan shroud with strap ties.
6. Install engine fan belt (Figure 1, Item 16) and adjust tension as described in WP 0072.
7. Install the upper radiator hose as described in WP 0070.
8. Refill the radiator with coolant as described in WP 0058.
9. Install top access panel (Figure 1, Item 9) and secure using 20 bolts (Figure 1, Item 8), new lock washers (Figure 1, Item 7) and flat washers (Figure 1, Item 6).
10. Install exhaust pipe cap (Figure 1, Item 4) and tighten nut (Figure 1, Item 5) and bolt (Figure 1, Item 3).
11. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
12. Install front and rear access panels (Figure 1, Items 2 and 10) onto Genset (Figure 1, Item 1).
13. Install cargo restraints (not shown).
14. Start Genset in accordance with WP 0005, Genset Start Procedure.

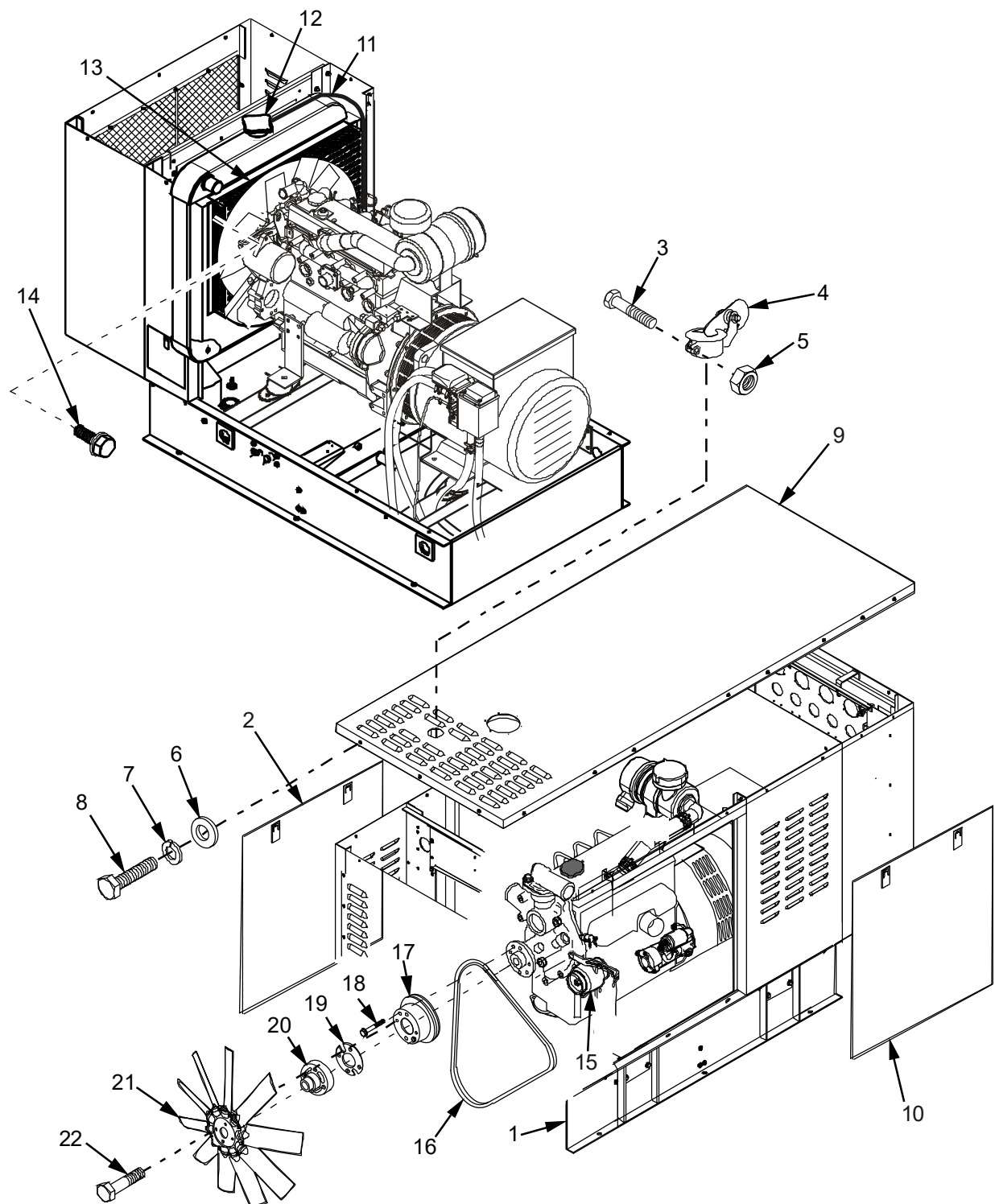


Figure 1. Fan - Replace.

END OF TASK**END OF WORK PACKAGE****TM: 1006310****0050-5/6 blank****HDT Expeditionary Systems, Inc.**

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MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET WATER PUMP MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset engine water pump. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

WATER PUMP - REPLACE

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set, (WP 0132, Table 2, Item 4)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Water pump
Gasket
Cloth, Abrasive (WP 0180, Table 1, Item 10, 11)
Cloth, cleaning (WP 0180, Table 1, Item 12)
Silicone sealant, RTV (WP 0180, Table 1, Item 39)**References**WP 0005, WP 0056, WP 0070,
WP 0071, WP 0073,**Equipment Condition**Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

REMOVAL

1. Verify that Genset (Figure 1, Item 20) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove the front and rear access panels (Figure 1, Items 5 and 21) on Genset (Figure 1, Item 20) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
5. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secures exhaust pipe cap (Figure 1, Item 2). Remove exhaust pipe cap (Figure 1, Item 2) and set aside.
6. Remove and retain 20 bolts (Figure 1, Item 22), lock washers (Figure 1, Item 23), and flat washers (Figure 1, Item 24) that secure top access panel (Figure 1, Item 4) to Genset (Figure 1, Item 20). Remove top access panel (Figure 1, Item 4) and set aside. Discard lock washers (Figure 1, Item 23).
7. Drain engine coolant as described in WP 0070.

REMOVAL – Continued**NOTE**

Place towels or pads below radiator to absorb any excess fluid.

8. Remove two clamps (Figure 1, Items 7 and 13) and coolant hoses (Figure 1, Items 6 and 12) from water pump (Figure 1, Item 14) and thermostat housing (Figure 1, Item 8).
9. Remove upper radiator hose as described in WP 0070.
10. Remove thermostat housing (Figure 1, Item 8) as described in WP 0057.
11. Loosen alternator (Figure 1, Item 17) as described in WP 0071.
12. Remove cooling fan (Figure 1, Item 19) as described in WP 0073 and fan belt (Figure 1, Item 16) as described in WP 0073.

NOTE

Water pump bolts are different sizes. Attempting to mount water pump with bolts in incorrect positions could result in damage to bolts or failure of water pump seal. Note which holes each bolt came from.

13. Remove and retain five bolts (Figure 1, Item 15) from water pump (Figure 1, Item 14).
14. Remove and retain two nuts (Figure 1, Item 18) from water pump alignment studs (Figure 1, Item 11).
15. Tap on water pump (Figure 1, Item 14) to break seal and pry away from engine block (Figure 1, Item 10).
16. Remove water pump (Figure 1, Item 14) and water pump gasket (Figure 1, Item 9).

END OF TASK**REPLACEMENT****CAUTION**

When performing the following step, do not damage the water pump or thermostat housing.

1. Scrape off old gasket material from engine block (Figure 1, Item 10). If necessary, clean area with Cloth, Abrasive (waterproof) to remove all residue.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

2. Apply thin layer of silicone sealant, RTV to mating surfaces on water pump (Figure 1, Item 14) and engine block (Figure 1, Item 10).

REPLACEMENT – Continued

3. Attach new water pump gasket (Figure 1, Item 9) to water pump (Figure 1, Item 14).

NOTE

Water pump bolts (Figure 1, Item 15) are different sizes. Attempting to mount water pump with bolts in incorrect positions could result in damage to bolts or failure of water pump seal.

4. Place five bolts (Figure 1, Item 15) through appropriate holes of water pump (Figure 1, Item 14) and gasket (Figure 1, Item 9).

NOTE

Gasket (Figure 1, Item 9) should hold five bolts (Figure 1, Item 15) in position during alignment of the water pump (Figure 1, Item 14).

5. Align water pump (Figure 1, Item 14) to alignment studs (Figure 1, Item 11) on engine block (Figure 1, Item 10) and insert water pump (Figure 1, Item 14) onto alignment studs (Figure 1, Item 11).
6. Tighten five bolts (Figure 1, Item 15) finger tight.
7. Replace two nuts (Figure 1, Item 18) onto alignment studs (Figure 1, Item 11) and finger tighten.

NOTE

When performing the following step, tighten five bolts (Figure 1, Item 15) and two nuts (Figure 1, Item 18) using a cross pattern to ensure a good seat (i.e. tighten a bolt first on one side, then the opposite side). Work your way around the water pump.

8. Using torque wrench, tighten two nuts (Figure 1, Item 18) and five bolts (Figure 1, Item 15) to 14~21 ft./lb (19~28 n-m/1.9~2.9 kgf-m).
9. Replace cooling fan (Figure 1, Item 19) as described in WP 0073 and fan belt (Figure 1, Item 16) as describe in WP 0073.
10. Replace thermostat housing (Figure 1, Item 8) as described in WP 0057.
11. Replace alternator (Figure 1, Item 17) as described in WP 0071.

NOTE

Ensure that clamps (Figure 1, Items 7 and 13) are present on coolant hoses (Figure 1, Items 6 and 12) before performing the next step.

12. Replace two coolant hoses (Figure 1, Items 6 and 12) onto water pump (Figure 1, Item 14) and thermostat housing (Figure 1, Item 8) and secure using two clamps (Figure 1, Items 7 and 13).
13. Replace upper radiator hose as described in WP 0070.
14. Replace engine coolant as described in WP 0070.

REPLACEMENT – Continued

15. Replace top access panel (Figure 1, Item 4) onto Genset (Figure 1, Item 20) and secure using 20 bolts (Figure 1, Item 22), new lock washers (Figure 1, Item 23) and flat washers (Figure 1, Item 24).
16. Replace exhaust pipe cap (Figure 1, Item 2) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 1) that secure exhaust pipe cap (Figure 1, Item 2).
17. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
18. Replace front and rear access panels (Figure 1, Items 5 and 21) on Genset (Figure 1, Item 20).
19. Replace cargo restraints (not shown).
20. Start Genset (Figure 1, Items 1) in accordance with WP 0005, Genset Start Procedure.

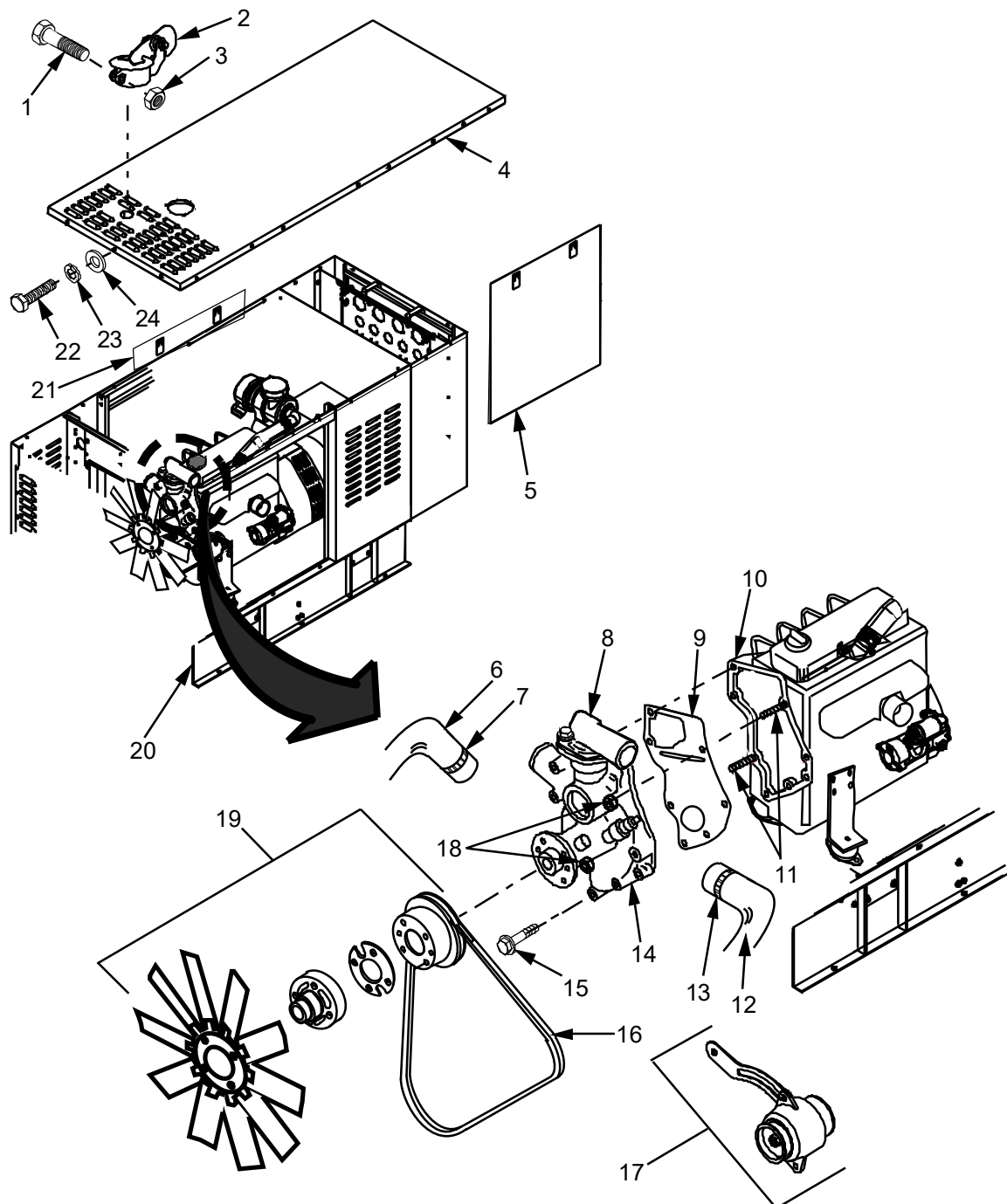


Figure 1. Water Pump - Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET EXHAUST SYSTEM MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the exhaust flex pipe, elbow and muffler for the Genset. This work package also provides information on the removal and replacement of the exhaust manifold and gasket for the Genset.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across and electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

EXHAUST FLEX PIPE, ELBOW, AND MUFFLER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Exhaust flex pipe
Exhaust elbow
Muffler**References**

WP 0005

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

FLEX PIPE**REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front and rear access panels (Figure 1, Items 7 and 8) and set aside.

CAUTION

Due to moisture and constant heating and cooling of exhaust system, hardware can become rusted and brittle. Hardware can be extremely difficult to loosen and disassemble. Do not force. Hardware damage could occur to exhaust pipe clamps and U-bolts or to exhaust flex pipe.

4. Remove and retain two nuts (Figure 1, Item 14) from clamp (Figure 1, Item 15) and U-bolt (Figure 1, Item 17).
5. Remove and retain clamp (Figure 1, Item 15) and U-bolt (Figure 1, Item 17).

REMOVAL – Continued

6. Remove and retain two nuts (Figure 1, Item 11) from clamp (Figure 1, Item 21) and U-bolt (Figure 1, Item 20).
7. Remove and retain clamp (Figure 1, Item 21) and U-bolt (Figure 1, Item 20).

NOTE

When performing the following step, it may be necessary to grip the exhaust pipe and twist in a clockwise/counter clockwise motion to break seal.

8. Remove exhaust flex pipe (Figure 1, Item 18) from exhaust manifold (Figure 1, Item 16) and exhaust elbow (Figure 1, Item 25) (located on the enclosure wall).
9. Slide exhaust flex pipe (Figure 1, Item 18) out of exhaust blanket (Figure 1, Item 19).

END OF TASK**REPLACEMENT****NOTE**

New exhaust flex pipe (Figure 1, Item 18) is not pre-bent. Care must be taken to ensure that exhaust flex pipe (Figure 1, Item 18) is not twisted when assembled to reduce excessive stress on the exhaust flex pipe (Figure 1, Item 18) and cause premature failure.

1. Slide exhaust blanket (Figure 1, Item 19) onto exhaust flex pipe (Figure 1, Item 18) so that angle in heat shield is aligned with 90-degree bend in exhaust flex pipe (Figure 1, Item 18).
2. Insert exhaust flex pipe (Figure 1, Item 18) into the exhaust manifold (Figure 1, Item 16).

NOTE

If reusing exhaust system parts, parts may be crimped from prior installation. Use of pipe wrench may be necessary to insert pipe fully.

3. If necessary, bend exhaust flex pipe (Figure 1, Item 18) to align with exhaust elbow (Figure 1, Item 25).
4. Insert the exhaust flex pipe (Figure 1, Item 18) into the exhaust pipe elbow (Figure 1, Item 25).
5. Install two U-bolts (Figure 1, Items 17 and 20) and clamps (Figure 1, Items 15 and 21). Secure with four nuts (Figure 1, Items 11 and 14).
6. Install two access panels (Figure 1, Items 7 and 8).
7. Install cargo restraints (not shown).
8. Start Genset in accordance with Genset Start Procedure (WP 0005).

END OF TASK

EXHAUST ELBOW**REMOVAL****WARNING**

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front and rear access panels (Figure 1, Items 7 and 8) and set aside.
4. Loosen but do not remove nut (Figure 1, Item 6) and bolt (Figure 1, Item 4) that secures exhaust pipe cap (Figure 1, Item 5). Remove exhaust pipe cap (Figure 1, Item 5) and set aside.
5. Remove and retain 20 sheet metal screws (Figure 1, Item 1), lock washers (Figure 1, Item 2) and flat washers (Figure 1, Item 3) that secure top access panel (Figure 1, Item 32) to Genset enclosure. Remove top access panel (Figure 1, Item 32) and set aside.

CAUTION

Due to moisture and constant heating and cooling of exhaust system, hardware can become rusted and brittle. Hardware can be extremely difficult to loosen and disassemble. Do not force hardware; damage could occur to clamps (Figure 1, Items 21 and 26) and U-bolts (Figure 1, Items 20 and 24) or to exhaust flex pipe (Figure 1, Item 18) or exhaust pipe elbow (Figure 1, Item 25).

6. Remove and retain two nuts (Figure 1, Item 11) from clamp (Figure 1, Item 21) and U-bolt (Figure 1, Item 20).
7. Remove and retain clamp (Figure 1, Item 21) and U-bolt (Figure 1, Item 20).
8. Remove exhaust flex pipe (Figure 1, Item 18) from exhaust pipe elbow (Figure 1, Item 25).
9. Remove and retain two nuts (Figure 1, Item 29) from clamp (Figure 1, Item 26) and U-bolt (Figure 1, Item 24).
10. Remove and retain clamp (Figure 1, Item 26) and U-bolt (Figure 1, Item 24).
11. Loosen but do not remove bolt (Figure 1, Item 30), nut (Figure 1, Item 10), and two flat washers (Figure 1, Item 9) that secure mounting bracket (Figure 1, Item 23) to muffler (Figure 1, Item 31).

NOTE

When performing the following step, do not slide muffler (Figure 1, Item 31) out of mounting bracket (Figure 1, Item 23). Allow mounting bracket (Figure 1, Item 23) to support muffler (Figure 1, Item 31).

12. Slide muffler (Figure 1, Item 31) away from exhaust pipe elbow (Figure 1, Item 25).

REMOVAL – Continued

13. Remove and retain four nuts (Figure 1, Item 27), flat washers (Figure 1, Item 28), bolts (Figure 1, Item 13) and flat washers (Figure 1, Item 12) that secure exhaust plate (Figure 1, Item 22) and exhaust pipe elbow (Figure 1, Item 25) to Genset frame.
14. Remove exhaust plate (Figure 1, Item 22) and exhaust pipe elbow (Figure 1, Item 25).

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps, inspect all parts for wear and tear and corrosion. If excessive wear or corrosion is present, replace affected parts.

Before tightening various clamps and associated hardware, align top of Genset with exhaust stack to ensure all openings align properly.

1. Install exhaust plate (Figure 1, Item 22) and exhaust pipe elbow (Figure 1, Item 25) and secure using four nuts (Figure 1, Item 27), bolts (Figure 1, Item 13) and eight flat washers (Figure 1, Items 12 and 28).
2. Slide muffler (Figure 1, Item 31) into exhaust pipe elbow (Figure 1, Item 25).
3. Assemble U-bolt (Figure 1, Item 24) and clamp (Figure 1, Item 26) and position on exhaust pipe elbow (Figure 1, Item 25) and secure using two nuts (Figure 1, Item 29).

NOTE

Ensure that exhaust bracket has not separated from the inside of the enclosure wall.

4. Position muffler (Figure 1, Item 31) in mounting bracket (Figure 1, Item 23) and tighten bolt (Figure 1, Item 30), nut (Figure 1, Item 10), and two flat washers (Figure 1, Item 9).
5. Install exhaust flex pipe (Figure 1, Item 18) onto exhaust pipe elbow (Figure 1, Item 25).
6. Assemble U-bolt (Figure 1, Item 20) and clamp (Figure 1, Item 21). Position on exhaust pipe elbow (Figure 1, Item 25) and secure using two nuts (Figure 1, Item 11).
7. Tighten all hardware associated with clamps and brackets.
8. Install top access panel (Figure 1, Item 32) to Genset enclosure and secure with 20 sheet metal screws (Figure 1, Item 1), lock washers (Figure 1, Item 2) and flat washers (Figure 1, Item 3).
9. Install exhaust pipe cap (Figure 1, Item 5) and tighten nut (Figure 1, Item 6) and bolt (Figure 1, Item 4).
10. Install two access panels (Figure 1, Items 7 and 8).
11. Start Genset in accordance with Genset Start Procedure (WP 0005).

END OF TASK

MUFFLER**REMOVAL****WARNING**

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005), Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Loosen but do not remove nut (Figure 1, Item 6) and bolt (Figure 1, Item 4) that secures exhaust pipe cap (Figure 1, Item 5). Remove exhaust pipe cap (Figure 1, Item 5) and set aside.
4. Remove and retain 20 sheet metal screws (Figure 1, Item 1), lock washers (Figure 1, Item 2) and flat washers (Figure 1, Item 3) that secures top access panel (Figure 1, Item 32) to Genset enclosure. Remove top access panel (Figure 1, Item 32) and set aside.
5. Remove and retain two nuts (Figure 1, Item 29) from clamp (Figure 1, Item 26) and U-bolt (Figure 1, Item 24).
6. Remove and retain clamp (Figure 1, Item 26) and U-bolt (Figure 1, Item 24).
7. Loosen but do not remove bolt (Figure 1, Item 30), nut (Figure 1, Item 10), and two flat washers (Figure 1, Item 9) that secure mounting bracket (Figure 1, Item 23) to muffler (Figure 1, Item 31).
8. Slide muffler (Figure 1, Item 31) away from exhaust pipe elbow (Figure 1, Item 25) and out of mounting bracket (Figure 1, Item 23).

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps, inspect all parts for wear and tear and corrosion. If excessive wear or corrosion is present, replace affected pieces.

Before tightening various clamps and associated hardware, align top of Genset with exhaust stack to ensure all openings align properly.

Ensure that exhaust bracket has not separated from the inside of the enclosure wall.

1. Slide muffler (Figure 1, Item 31) into mounting bracket (Figure 1, Item 23) and connect to exhaust pipe elbow (Figure 1, Item 25).
2. Position muffler (Figure 1, Item 31) in mounting bracket (Figure 1, Item 23) and tighten bolt (Figure 1, Item 30), nut (Figure 1, Item 10) and two flat washers (Figure 1, Item 9).
3. Install clamp (Figure 1, Item 26) and U-bolt (Figure 1, Item 24) and secure using two nuts (Figure 1, Item 29).

REPLACEMENT – Continued

4. Install top access panel (Figure 1, Item 32) to Genset enclosure and secure with 20 sheet metal screws (Figure 1, Item 1), lock washers (Figure 1, Item 2) and flat washers (Figure 1, Item 3).
5. Install exhaust pipe cap (Figure 1, Item 5) and tighten nut (Figure 1, Item 6) and bolt (Figure 1, Item 4).
6. Install cargo restraints (not shown).
7. Start Genset in accordance with Genset Start Procedure (WP 0005).

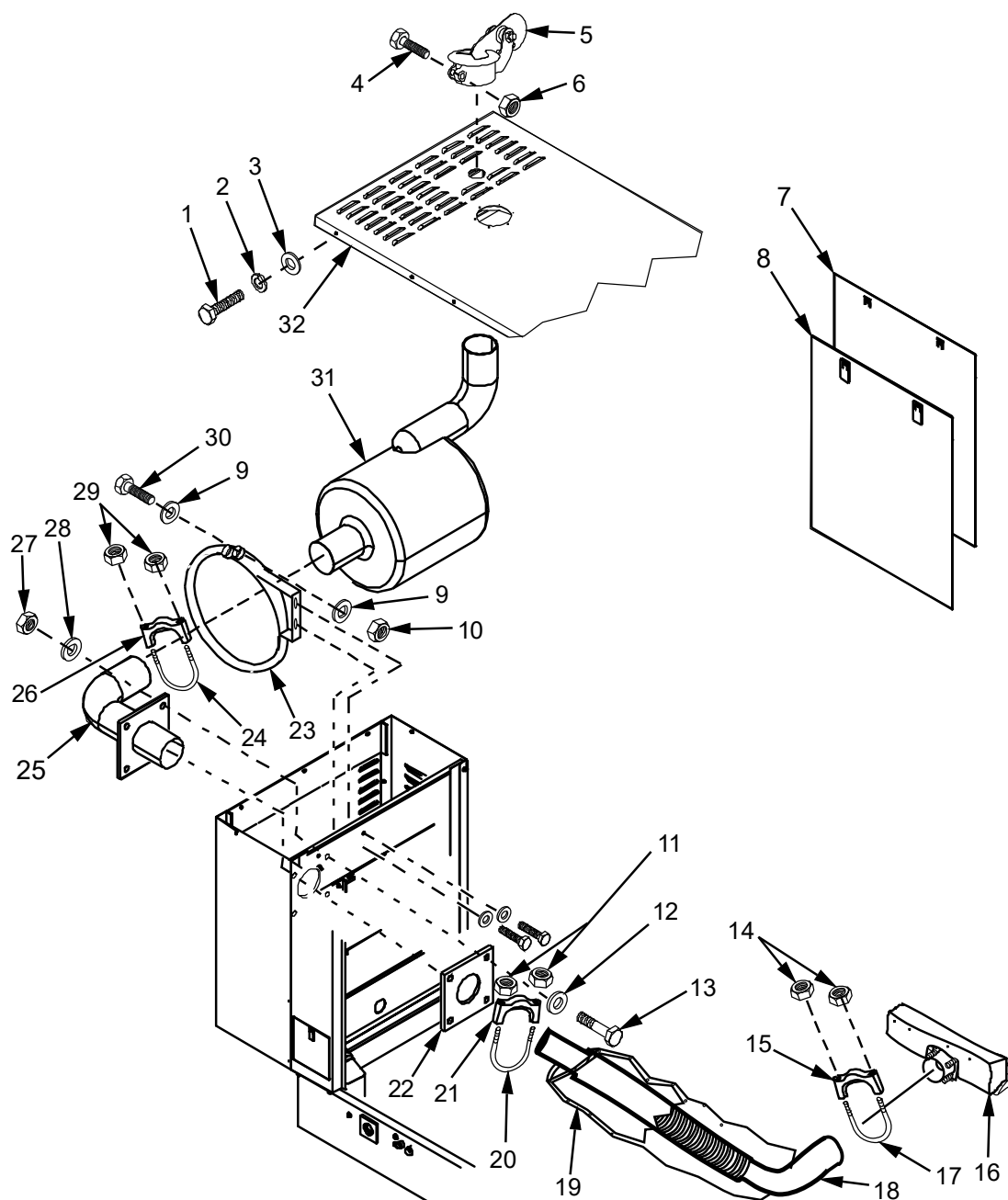


Figure 1. Exhaust Flex Pipe, Elbow and Muffler Removal/Replacement.

END OF TASK

EXHAUST MANIFOLD AND GASKET REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Personnel Required

Power Generation Equipment

Mechanic, MOS 91D (1)

Materials/Parts

Exhaust manifold

Exhaust manifold gasket

T-slot gasket

Anti-seize compound, (WP 0180, Table 1, Item 3)

References

WP 0005

Equipment Condition

Genset shut down

BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front and rear access panels and set aside.

CAUTION

Due to moisture and constant heating and cooling of exhaust system, hardware can become rusted and brittle. Hardware can be extremely difficult to loosen and disassemble. Do not force. Hardware damage could occur to exhaust pipe clamps and U-bolts or to exhaust flex pipe.

4. Remove three locking clips securing manifold heat shield to manifold. Remove heat shield.
5. Remove U-bolt (Figure 2, Item 11), clamp (Figure 2, Item 9) and two nuts (Figure 2, Item 8) from exhaust pipe (Figure 2, Item 10) and T-slot (Figure 2, Item 7).
6. Remove four mounting nuts (Figure 2, Item 12) to remove T-slot (Figure 2, Item 7) and gasket (Figure 2, Item 6) from manifold (Figure 2, Item 4). Discard gasket.
7. Remove four mounting bolts (Figure 1, Item 14) from manifold (Figure 2, Item 4).

REMOVAL – Continued

8. Remove four locking nuts (Figure 2, Item 13) from manifold (Figure 1, Item 4).
9. Slide exhaust manifold (Figure 2, Item 4) off of engine (Figure 2, Item 1) and discard old gasket (Figure 2, Item 3).

END OF TASK**REPLACEMENT****NOTE**

Prior to performing replacement procedure, ensure area is clean and free of dirt, grime and old gasket residue.

1. Place new manifold gasket (Figure 2, Item 3) over exhaust mounting studs (Figure 2, Item 2).
2. Slide exhaust manifold (Figure 2, Item 4) into position on mounting studs.
3. Install four locking nuts (Figure 2, Item 13) on the manifold mounting studs.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

4. Apply anti-seize compound on the exhaust manifold bolts (Figure 1, Item 14) and install into exhaust manifold (Figure 1, Item 4) and engine (Figure 2, Item 1).
5. Using torque wrench, tighten manifold bolts (Figure 2, Item 14) and locking nuts (Figure 2, Item 13) to 14~21 ft./lb (19~28 n-m/1.9~2.9 kgf-m). (Tighten in a cross pattern, starting from the center and working out).
6. Install new gasket (Figure 2, Item 6) onto manifold studs (Figure 2, Item 5).
7. Install T-Slot (Figure 2, Item 7) onto the manifold (Figure 2, Item 4).
8. Install four mounting nuts (Figure 2, Item 12) and tighten.
9. Install U-bolt (Figure 2, Item 11), clamp (Figure 2, Item 9) and 2 nuts (Figure 2, Item 8) onto exhaust pipe (Figure 2, Item 10) and T-slot (Figure 2, Item 7).
10. Install heat shield and secure with three locking clips.

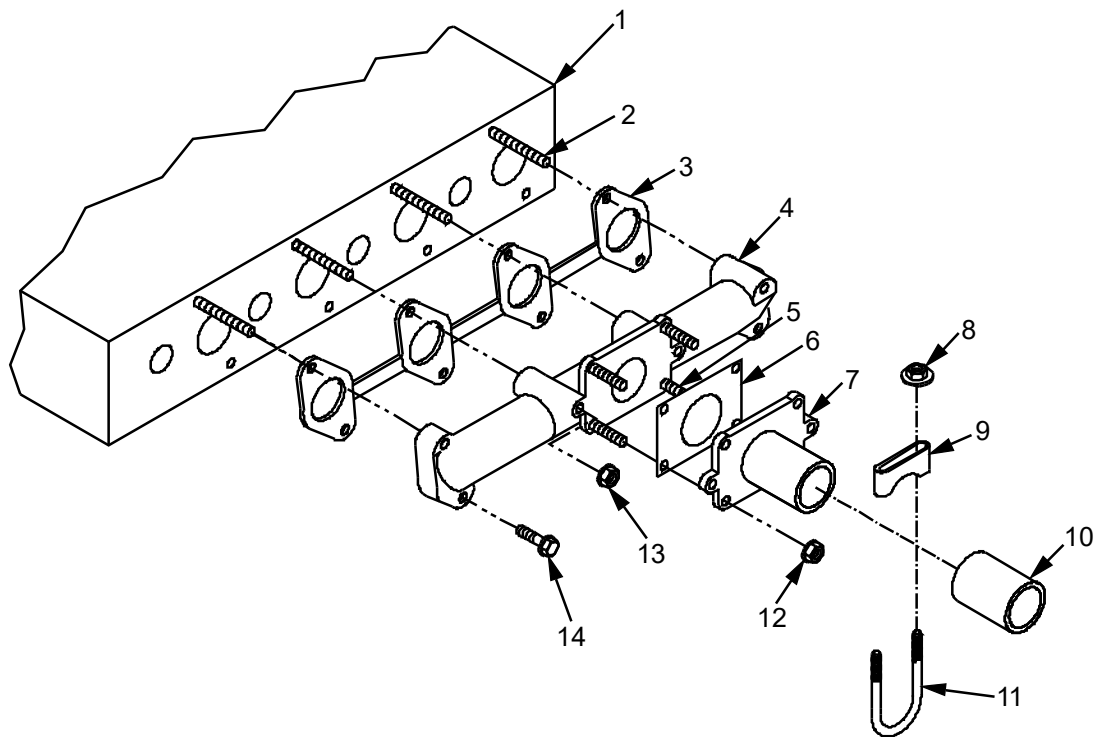


Figure 2. Exhaust Manifold and Gasket Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET FUEL PANEL MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the Genset fuel panel. They consist of:

- Fuel selector switch removal and replacement
- Auxiliary fuel line connectors removal and replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Wear appropriate eye protection when performing maintenance. Metal pieces, fluids, dirt, grease, corrosion, and escaping vapors and gasses present. Failure to comply may result in injury to personnel.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the Genset. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

CAUTION

Never attempt to connect or disconnect cables or hoses with Genset is in operation. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal when conducting any procedures on the Genset.

Never re-use gaskets, seals, "O"-rings, springs, damaged parts or hardware that is deficient. These items are mandatory replacement parts. Failure to replace these items could cause leaks or premature malfunction(s) and eventually damage the system.

GENSET FUEL SELECTOR SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Fuel selector switch
Cloth, cleaning (WP 0180, Table 1, Item 13)

References

WP 0005

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

REMOVAL**WARNING**

Never attempt to perform maintenance when Genset is in operation.
To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Prior to performing the following procedure, ensure fuel tank is below 3/4 tank.

To ease installation, mark input and output hoses for proper connections prior to performing the following step (See Figure 1 for connections).

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect battery ground cable (black) from battery ground terminal. If necessary, refer to procedure in WP 0056.
3. Remove and retain sixteen bolts (Figure 2, Item 5), lock washers (Figure 2, Item 4), and flat washers (Figure 2, Item 3) that secure radiator access panel (Figure 2, Item 2) to Genset (Figure 2, Item 1). Remove radiator access panel (Figure 2, Item 2).
4. Loosen clamps (Figure 2, Item 10) that secure input and output hoses (Figure 2, Item 11) to selector switch (Figure 2, Item 12).
5. Remove input and output hoses (Figure 2, Item 11) from ports on selector switch (Figure 2, Item 12).
6. Remove and retain locking screw (Figure 2, Item 6) from selector switch handle (Figure 2, Item 7).
7. Remove and retain selector switch handle (Figure 2, Item 7) from selector switch (Figure 2, Item 12).

REMOVAL - Continued

8. Remove and retain two bolts (Figure 2, Item 8) that secure selector switch (Figure 2, Item 12) to bracket (Figure 2, Item 9). Remove selector switch (Figure 2, Item 12).

END OF TASK**REPLACEMENT**

1. Place selector switch (Figure 2, Item 12) onto bracket (Figure 2, Item 9) and secure using two bolts (Figure 2, Item 8).

NOTE

If necessary, refer to Figure 1 for proper connections of input and output hoses.

2. Inspect input and output hoses (Figure 2, Item 11) and replace as necessary.
3. Install input and output hoses (Figure 2, Item 11) onto proper ports of selector switch (Figure 2, Item 12).
4. Install selector switch handle (Figure 2, Item 7) and secure using locking screw (Figure 2, Item 6).
5. Install radiator access panel (Figure 2, Item 2) onto Genset (Figure 2, Item 1) and secure using sixteen bolts (Figure 2, Item 5), lock washers (Figure 2, Item 4), and flat washers (Figure 2, Item 3).
6. Connect negative terminal to battery (see WP 0056).
7. Start Genset in accordance with Genset Start Procedure (WP 0005).

NOTE

Supply lines have green banding and return lines have yellow banding.

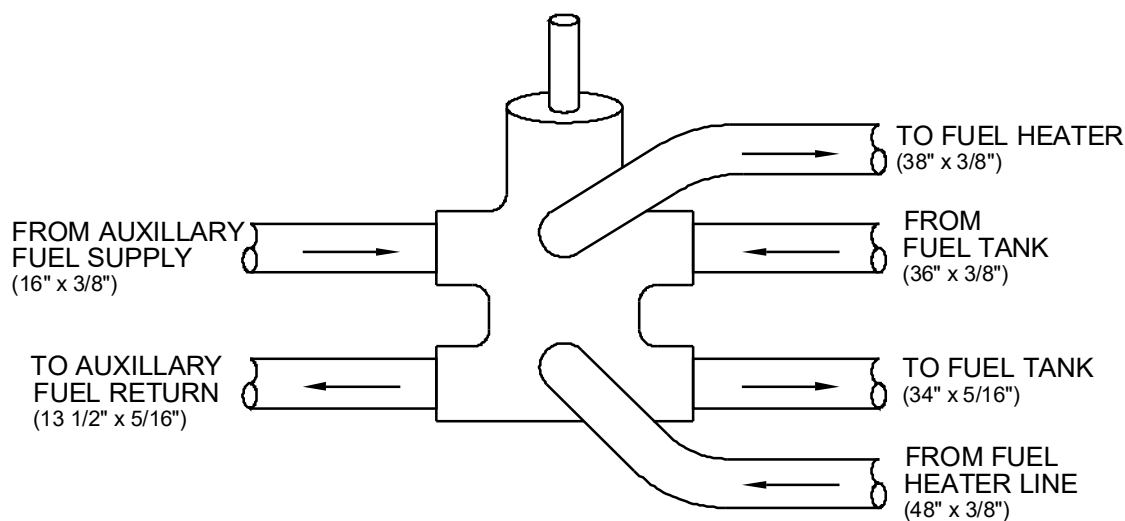


Figure 1. Fuel Selector Switch Connections.

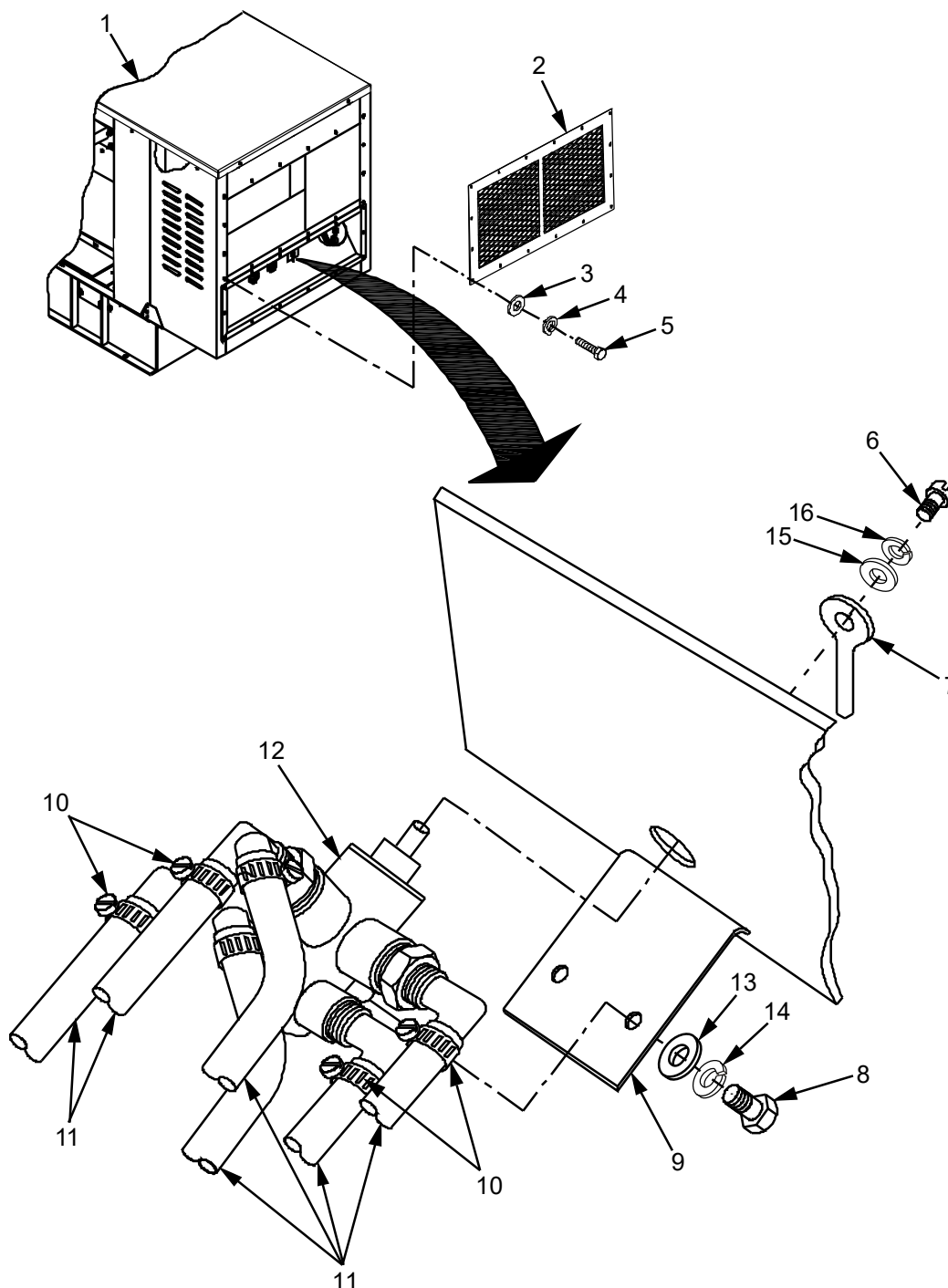


Figure 2. Fuel Selector Switch Removal/Replacement.

END OF TASK

GENSET AUXILIARY FUEL PORTS REMOVAL/REPLACEMENT

Tools and Special Tools

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Fuel ports
Cloth, cleaning (WP 0180, Table 1, Item 13)
Anti-seize tape (WP 0180, Table 1, Item 58)**References**

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

REMOVAL**NOTE**

Prior to performing the following procedure, ensure fuel tank is below 3/4 tank.

Supply lines have green banding and return lines have yellow banding.

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect battery ground cable (black) from battery ground terminal. If necessary, refer to procedure in WP 0056.
3. Verify that hoses have been disconnected from auxiliary fuel port(s) (Figure 3, Item 7).
4. Remove and retain sixteen bolts (Figure 3, Item 5) lock washers (Figure 3, Item 4), and flat washers (Figure 3, Item 3) that secure radiator access panel (Figure 3, Item 2) to Genset (Figure 3, Item 1). Remove radiator access panel (Figure 3, Item 2).
5. Loosen clamp (Figure 3, Item 10) that secures input/output hose (Figure 3, Item 11) to adapter (Figure 3, Item 9).

REMOVAL – Continued

6. Remove input/output hose (Figure 3, Item 11) from adapter (Figure 3, Item 9) and set aside (if necessary place in small container to collect residual fuel).
7. Remove adapter (Figure 3, Item 9) and 90° elbow (Figure 3, Item 6) from auxiliary fuel port (Figure 3, Item 7) being replaced.
8. Remove auxiliary fuel port (Figure 3, Item 7) from Z-panel (Figure 3, Item 8).

END OF TASK

REPLACEMENT**NOTE**

Wrap all threaded joints with anti-seize tape.

Auxiliary supply line has green banding and Auxiliary return line have yellow banding.

1. Insert auxiliary fuel port (Figure 3, Item 7) through Z-panel (Figure 3, Item 8) and secure using 90° elbow (Figure 3, Item 6).
2. Install adapter (Figure 3, Item 9) onto 90° elbow (Figure 3, Item 6).
3. Inspect input/output hoses (Figure 3, Item 11) and replace as necessary.
4. Insert input/output hoses (Figure 3, Item 11) onto adapter (Figure 3, Item 9) and tighten clamp (Figure 3, Item 10).
5. Install radiator access panel (Figure 3, Item 2) onto Genset (Figure 3, Item 1) and secure using sixteen bolts (Figure 3, Item 5) lock washers (Figure 3, Item 4), and flat washers (Figure 3, Item 3).
6. Connect negative terminal to battery (See WP 0056).
7. Start Genset in accordance with Genset Start Procedure (WP 0005).

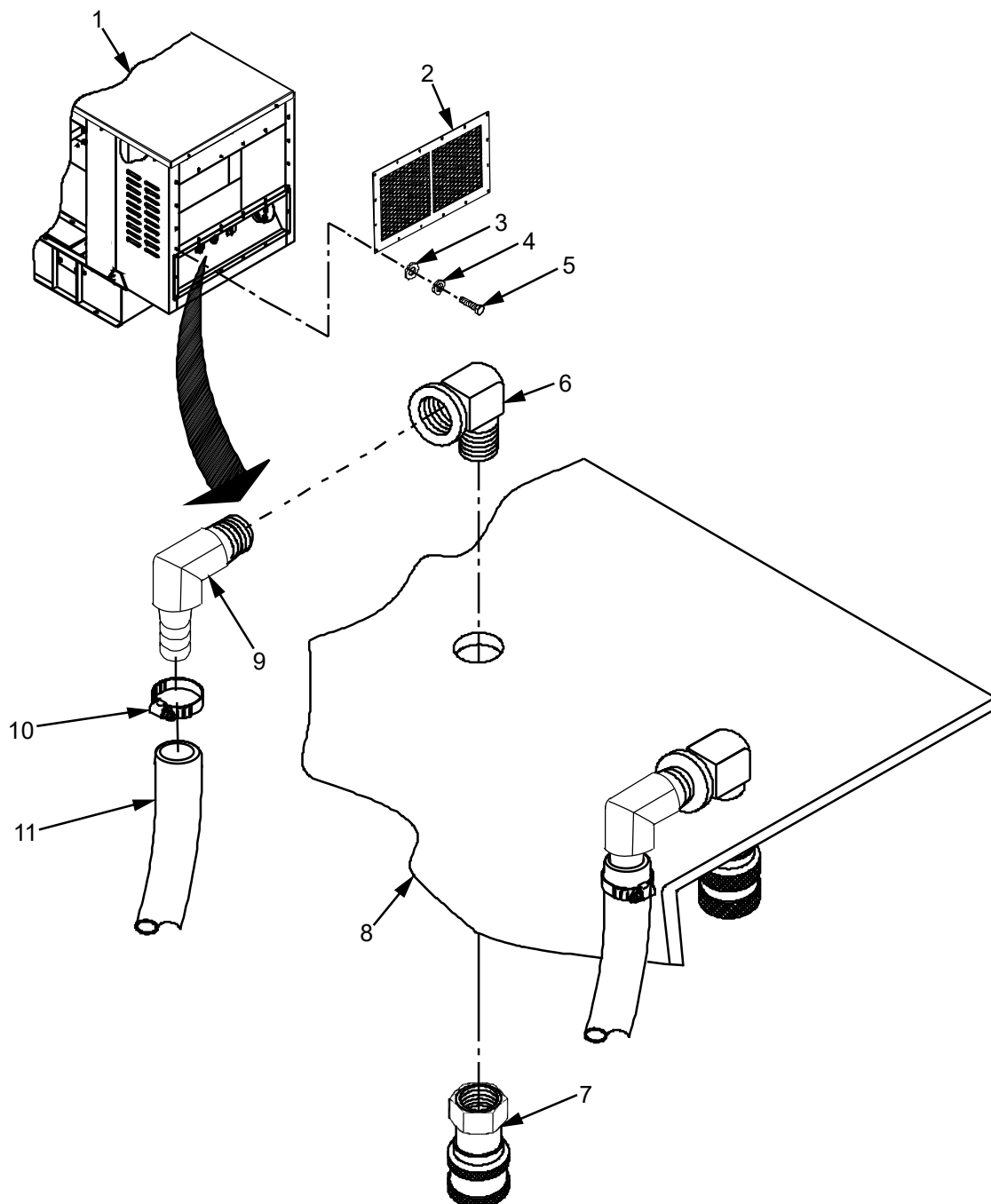


Figure 3. Auxiliary Fuel Port Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET FUEL INJECTION SYSTEM MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset electric fuel pump, fuel injector, fuel injector pump, fuel lines and procedure on how to Prime fuel system.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

FUEL INJECTOR - REPLACE

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set, (WP 0132, Table 2, Item 4)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Fuel injector
Cloth, cleaning (WP 0180, Table 1, Item 12)
Brush, soft cleaning (WP 0180, Table 1, Item 8)**References**

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

REMOVAL**WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

REMOVAL – Continued**NOTE**

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

It is not necessary to disconnect the fuel line from the fuel injector rail to remove fuel injectors.

It is necessary to rotate oil dipstick mount 180 degrees to gain access to fuel system on 2nd cylinder.

5. For 2nd cylinder fuel system access, remove two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3) from oil dipstick mount (Figure 1, Item 1). Rotate mount (Figure 1, Item 1) 180 degrees. Discard lock washers (Figure 1, Item 3).

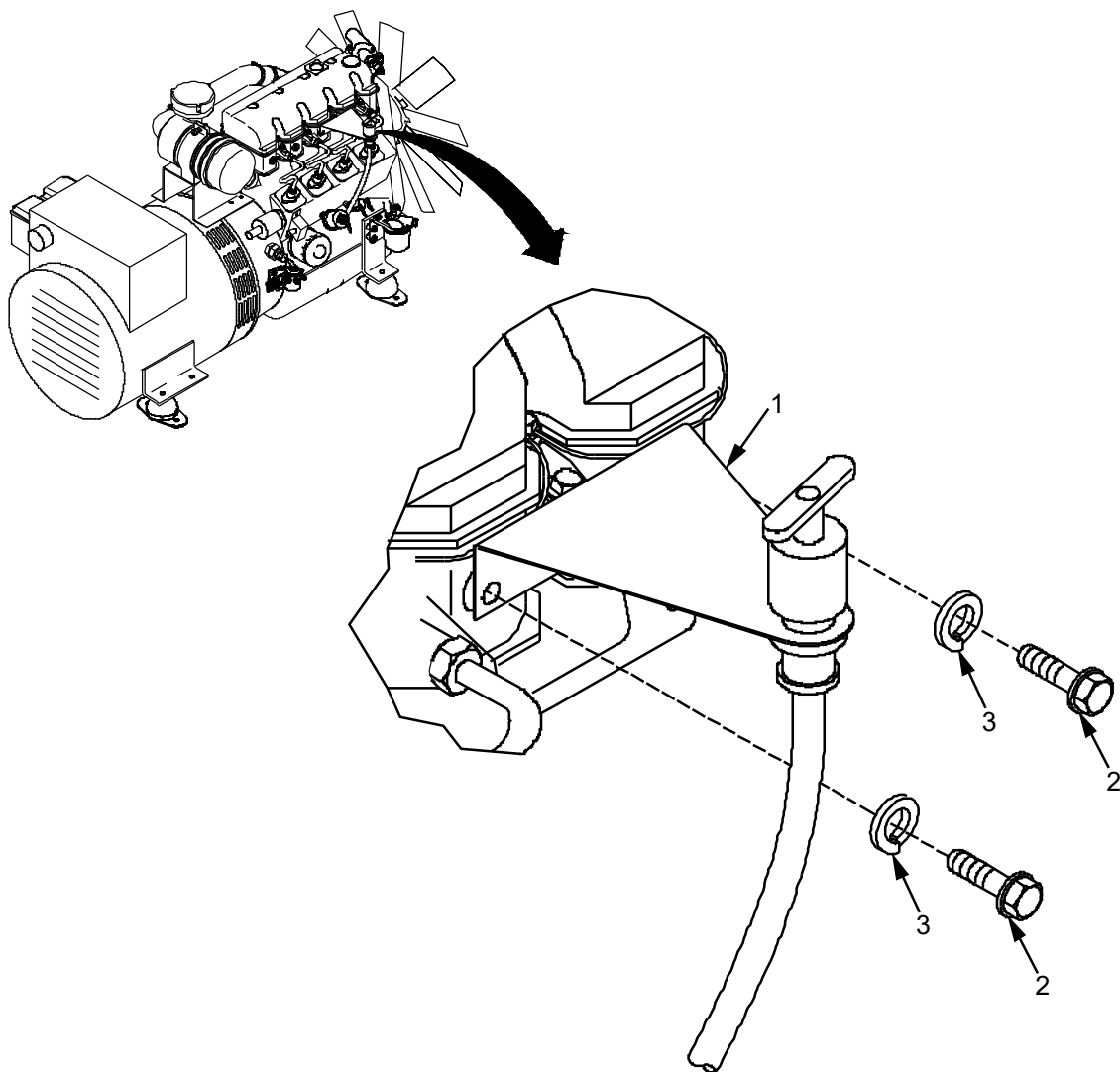


Figure 1. Oil Dipstick Mount.

REMOVAL – Continued**TM: 1006310****0054-3****HDT Expeditionary Systems, Inc.**

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CAUTION

Each fuel rail bolt has a hole to allow fuel to pass through into the injector. When removing bolts, place in a clean, dry area to prevent dirt and debris from clogging holes.

NOTE

It is not necessary to disconnect fuel line from fuel injector rail to remove fuel injectors. Only disconnect fuel line if replacing rail.

6. Remove four bolts (Figure 2, Item 1) from fuel rail (Figure 2, Item 9).
7. Lift fuel rail (Figure 2, Item 9) away from fuel injectors (Figure 2, Item 8) and set on top of valve cover.
8. Ensure that brass seals (Figure 2, Item 2) on fuel injector rail (Figure 2, Item 9) remain secured to rail.

CAUTION

When disassembling fuel system take care not to mix parts. Keep each cylinders' injector, fuel line, and bolts separate and reattach to appropriate cylinder when reassembling.

9. Disconnect injector fuel line (Figure 2, Item 5) from corresponding injector pump (Figure 2, Item 10).
10. Disconnect injector fuel line (Figure 2, Item 5) from fuel injector (Figure 2, Item 8).
11. Remove injector fuel line (Figure 2, Item 5) and set aside.
12. Remove bolt (Figure 2, Item 3) from fuel injector hold down (Figure 2, Item 4) and set aside.
13. Remove fuel injector hold down (Figure 2, Item 4) and set aside.
14. Using a flat tip screw driver, pry up on fuel injector (Figure 2, Item 8) to remove from engine block.

END OF TASK**CLEAN**

1. Wipe excess fuel from fuel injector.
2. Remove any loose carbon build up on tip of fuel injector (Figure 2, Item 7) with cleaning cloth.
3. Using a soft cleaning brush and solvent, clean carbon buildup from tip of fuel injector (Figure 2, Item 7).
4. Allow fuel injector to dry completely before reassembly.

END OF TASK

REPLACEMENT

1. Ensure fuel injector O-ring (Figure 2, Item 6) is in proper position and serviceable.
2. Press fuel injector (Figure 2, Item 8) into position until seated.
3. Install fuel injector hold down (Figure 2, Item 4) and bolt (Figure 2, Item 3).
4. Using torque wrench, tighten bolts (Figure 2, Item 3) on fuel injector hold down (Figure 2, Item 4) to 23~30 ft./lb (31~41 n-m/3.2~4.2 kgf-m).
5. Align fuel rail (Figure 2, Item 9) with fuel injectors (Figure 2, Item 8).
6. Insert four bolts (Figure 2, Item 1) through fuel rail (Figure 2, Item 9) and brass seals (Figure 2, Item 2) into fuel injector heads.
7. Using torque wrench, tighten fuel rail bolts (Figure 2, Item 1) to 7 to 10 ft./lb (10~14 n-m/1.0~1.4 kgf-m).
8. Place injector fuel line (Figure 2, Item 5) into position.
9. Finger tighten fuel line (Figure 2, Item 5) to corresponding injector pump (Figure 2, Item 10).
10. Finger tighten fuel line (Figure 2, Item 5) to corresponding fuel injector (Figure 2, Item 8).
11. Tighten fuel line connectors. Using torque wrench, tighten fuel lines to 11 to 18 ft./lb (19~28 n-m/1.9~2.9 kgf-m).
12. If necessary, reattach oil dipstick mount (Figure 1, Item 1) using two mounting bolts (Figure 1, Item 2) and two new lock washers (Figure 1, Item 3). Tighten down mounting bolts (Figure 1, Item 2).
13. Reconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
14. Install front and rear access panels and cargo restraints.
15. Start Genset in accordance with WP 0005, Genset Start Procedure.

REPLACEMENT – Continued

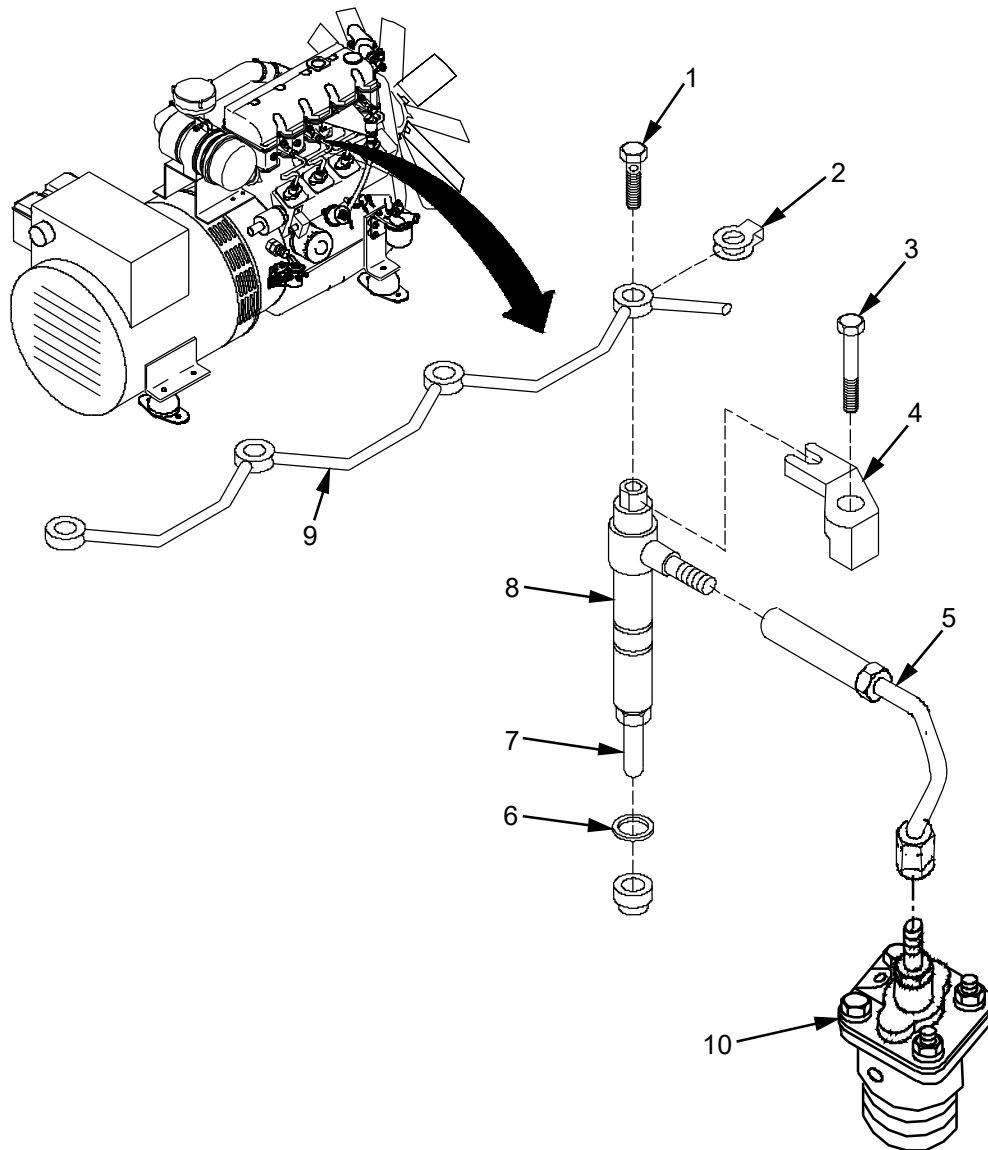


Figure 2. Fuel Injector Replace.

END OF TASK

FUEL INJECTOR PUMP - REPLACE

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set, (WP 0132, Table 2, Item 4)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Fuel injector pump with seal
Cloth, cleaning (WP 0180, Table 1, Item 12)

References

WP 0005, WP 0056, WP 0059

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

REMOVAL**WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove Genset rear access panel.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

It is not necessary to disconnect the fuel line from the fuel injector pump rail to remove fuel injector pumps.

It is necessary to rotate oil dipstick mount 180 degrees to gain access to fuel system on 2nd cylinder.

REMOVAL - Continued

5. For 2nd cylinder fuel system access, remove two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3) from oil dipstick mount (Figure 1, Item 1). Rotate mount (Figure 1, Item 1) 180 degrees. Otherwise proceed to step 6. Discard lock washers (Figure 1, Item 3).
6. Remove four bolts (Figure 3, Item 1) from fuel injector pump fuel rail (Figure 3, Item 11).
7. Remove four brass seals (Figure 3, Item 2) from top of fuel injector pump fuel rail (Figure 3, Item 11).

CAUTION

When disassembling fuel system take care not to mix parts. Keep each cylinder's injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder when reassembling.

8. Lift fuel rail (Figure 3, Item 11) away from fuel injector pumps (Figure 3, Item 5).
9. Remove four brass seals (Figure 3, Item 10) from bottom of fuel injector pump fuel rail (Figure 3, Item 11).
10. Disconnect fuel lines (Figure 3, Item 3) from corresponding injector pumps (Figure 3, Item 5).
11. Disconnect fuel lines (Figure 3, Item 3) from fuel injectors (Figure 2, Item 8).
12. Remove injector fuel lines (Figure 3, Item 3) and set aside.
13. Remove two mounting bolts (Figure 3, Item 9) from fuel injector pump (Figure 3, Item 5) being replaced.
14. Remove two mounting nuts (Figure 3, Item 4) from fuel injector pump mounting studs (Figure 3, Item 7).
15. Remove fuel injector pump (Figure 3, Item 5) and set aside. Remove old fuel injector pump seal (Figure 3, Item 6) and discard.
16. Remove glow plug connector strip (WP 0056 – 4 steps 6 – 8).

END OF TASK**REPLACEMENT**

1. Place new fuel injector pump seal (Figure 3, Item 6) on engine block. Seat seal over mounting studs (Figure 3, Item 7) to position.
2. Check alignment of actuator slide to ensure it will seat into actuator rail (Figure 3, Item 8) inside engine block.
3. Slide fuel injector pump (Figure 3, Item 5) into position on mounting studs (Figure 3, Item 7).
4. Install two bolts (Figure 3, Item 9) into injector pump (Figure 3, Item 5).
5. Install two nuts (Figure 3, Item 4) onto injector pump mounting studs (Figure 3, Item 7).

REPLACEMENT - Continued

6. Using torque wrench, tighten bolts (Figure 3, Item 9) and nuts (Figure 3, Item 4) to 11~18 ft./lb (19~28 n-m/ 1.9~2.9 kgf-m).
7. Align fuel rail (Figure 3, Item 11) with fuel injector pumps (Figure 3, Item 5).
8. Place original brass seals (Figure 3, Item 10) between fuel rail (Figure 3, Item 11) and pump (Figure 3, Item 5).
9. Insert four fuel rail bolts (Figure 3, Item 1) through top brass seals (Figure 3, Item 2), fuel rail (Figure 3, Item 11), bottom brass seal (Figure 3, Item 10) and into fuel injector pump (Figure 3, Item 5).
10. Using torque wrench, tighten fuel rail bolts (Figure 3, Item 1) to 15~18 ft/lbs (20~25 n-m/ 2.0~2.5 kgf-m).
11. Place injector pump fuel lines (Figure 3, Item 3) into position.
12. Finger tighten fuel lines (Figure 3, Item 3) to corresponding injector pumps (Figure 3, Item 5).
13. Finger tighten fuel lines (Figure 3, Item 3) to corresponding fuel injectors (Figure 2, Item 8).
14. Using torque wrench, tighten fuel line connectors on fuel line (Figure 3, Item 3) to 11~18 ft lbs. (19~28 n-m/1.9~2.8 kgf-m).
15. Install glow plug connector strip (WP 0059 – 5, steps 5 and 6)
16. If necessary, reattach oil dipstick mount (Figure 1, Item 1) using two mounting bolts (Figure 1, Item 2) and two new lock washers (Figure 1, Item 3). Tighten down mounting bolts.
17. Reconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
18. Install Genset rear access panel and install cargo restraints.
19. Start Genset in accordance with WP 0005, Genset Start Procedure.

REPLACEMENT – CONTINUED

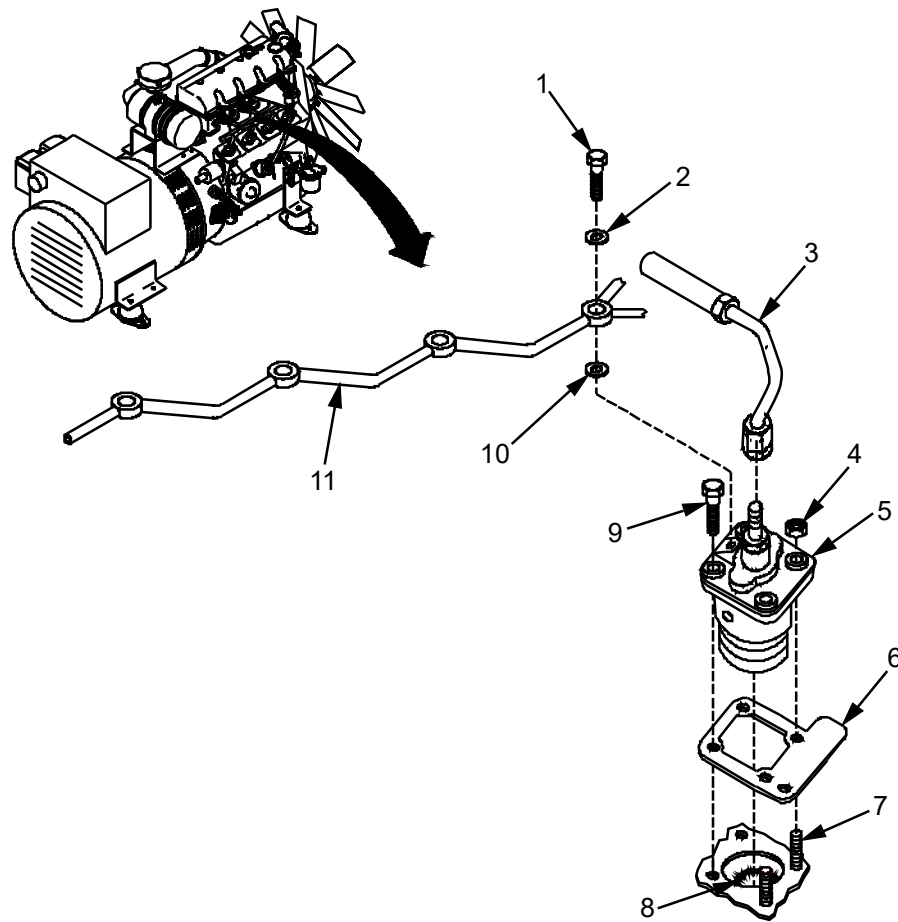


Figure 3. Fuel Injector Pump - Replace.

END OF TASK

FUEL INJECTION SYSTEM LINES - REPLACE

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set, (WP 0132, Table 2, Item 4)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Fuel line
Drain pan
Cloth, cleaning (WP 0180, Table 1, Item 12)**References**

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

FUEL INJECTOR FUEL LINE**REMOVAL****WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following procedure.

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints to gain access to rear access panel.
3. Remove Genset rear access panel.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

REMOVAL - Continued**NOTE**

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

It is necessary to rotate oil dipstick mount 180 degrees to gain access to fuel system on 2nd cylinder.

5. For 2nd cylinder fuel system access, remove two mounting bolts (Figure 1, Item 2) and two lock washers (Figure 1, Item 3) from oil dipstick mount (Figure 1, Item 1) and rotate mount (Figure 1, Item 1) 180 degrees. Discard lock washers (Figure 1, Item 3). Otherwise proceed to step 6.
6. Disconnect injector fuel line (Figure 4, Item 7) from fuel injector (Figure 4, Item 5).
7. Disconnect injector fuel line (Figure 4, Item 7) from corresponding fuel injector pump (Figure 4, Item 8).

END OF TASK**REPLACEMENT****CAUTION**

When assembling fuel system take care not to mix parts. Keep each cylinder's injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder.

1. Place injector fuel line (Figure 4, Item 7) into position.
2. Finger tighten injector fuel line (Figure 4, Item 7) to corresponding fuel injector pump (Figure 4, Item 8).
3. Finger tighten injector fuel line (Figure 4, Item 7) to corresponding fuel injector (Figure 4, Item 5).
4. Using torque wrench, tighten fuel line connectors to 11~18 ft./lb (19~28 n-m/1.9~2.9 kgf-m).
5. If necessary, reattach oil dipstick mount (Figure 1, Item 1) using two mounting bolts (Figure 1, Item 2) and two new lock washers (Figure 1, Item 3). Tighten down mounting bolts (Figure 1, Item 2).
6. Reconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
7. Install Genset rear access panel and install cargo restraints.
8. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK

FUEL INJECTOR RAIL**REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

CAUTION

When disassembling fuel system take care not to mix parts. Keep each cylinder injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder when reassembling.

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

5. Disconnect rubber fuel hose (Figure 4, Item 6) from fuel injector rail (Figure 4, Item 1).

CAUTION

Each bolt (Figure 4, Item 2) has a hole to allow fuel to pass through into the injector. When removing bolts, place in a clean, dry area to prevent dirt and debris from clogging holes.

6. Remove four bolts (Figure 4, Item 2) from fuel injector rail (Figure 4, Item 1).
7. Lift fuel injector rail (Figure 4, Item 1) and brass seals (Figure 4, Item 3) away from fuel injector heads (Figure 4, Item 4).

END OF TASK**REPLACEMENT****CAUTION**

When assembling fuel system take care not to mix parts. Keep each cylinder injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder.

1. Align fuel injector rail (Figure 4, Item 1) with fuel injector heads (Figure 4, Item 4).
2. Insert four bolts (Figure 4, Item 2) through fuel injector rail (Figure 4, Item 1) and brass seals (Figure 4, Item 3) into fuel injector heads (Figure 4, Item 4).
3. Using torque wrench, tighten fuel injector rail bolts (Figure 4, Item 2) to 7~10 ft./lb (10~14 n-m/1.0~1.4 kgf-m).

REPLACEMENT - Continued

4. Connect rubber fuel hose (Figure 4, Item 6) to fuel injector rail (Figure 4, Item 1).
5. Reconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
6. Install Genset rear access panel and install cargo restraints.
7. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK**FUEL INJECTOR PUMP FUEL RAIL****REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove front and rear access panels.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

CAUTION

When disassembling fuel system take care not to mix parts. Keep each cylinder's injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder when reassembling.

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

5. Disconnect fuel source hose (Figure 4, Item 12) from fuel injector pump fuel rail (Figure 4, Item 11).
6. Disconnect rubber hose (Figure 4, Item 6) from fuel injector pump fuel rail (Figure 4, Item 11).
7. Disconnect fuel return hose (Figure 4, Item 9) from fuel injector pump fuel rail (Figure 4, Item 11).
8. Remove fuel injector pump fuel lines (Figure 4, Item 7) as per this WP.
9. Remove glow plug connector strip (WP 0056 – 4 steps 6 – 8).
10. Remove four bolts (Figure 4, Item 14) from fuel injector pump fuel rail (Figure 4, Item 11).
11. Remove four brass seals (Figure 4, Item 13) from top of fuel injector pump rail (Figure 4, Item 11).
12. Lift fuel injector pump fuel rail (Figure 4, Item 11) away from fuel injector pumps (Figure 4, Item 8).
13. Remove four brass seals (Figure 4, Item 10) from bottom of fuel injector pump rail (Figure 4, Item 11).

END OF TASK

REPLACEMENT**CAUTION**

When assembling fuel system take care not to mix parts. Keep each cylinder's injector, pump, fuel line, bolts, and seals separate and reattach to appropriate cylinder.

1. Align fuel injector pump fuel rail (Figure 4, Item 11) with fuel injector pumps (Figure 4, Item 8).
2. Place four brass seals (Figure 4, Item 10) between fuel injector pump fuel rail (Figure 4, Item 11) and fuel injector pumps (Figure 4, Item 8).
3. Place four brass seals (Figure 4, Item 13) on top of fuel injector pump fuel rail (Figure 4, Item 11) and insert four bolts (Figure 4, Item 14).
4. Using torque wrench, tighten fuel rail bolts (Figure 4, Item 14) to 15~18 ft./lb (20~25 n-m/ 2.0~2.5 kgf-m).
5. Attach fuel return hose (Figure 4, Item 9) to fuel injector pump fuel rail (Figure 4, Item 11).
6. Attach rubber hose (Figure 4, Item 6) to fuel injector pump fuel rail (Figure 4, Item 11).
7. Attach fuel source hose (Figure 4, Item 12) to fuel injector pump fuel rail (Figure 4, Item 11).
8. Install fuel injector pump fuel lines (Figure 4, Item 7) as per this WP.
9. Install glow plug connector strip (WP 0056 – 5 steps 5 and 6).
10. Reconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
11. Install Genset rear access panel and install cargo restraints.
12. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK

RUBBER FUEL SUPPLY HOSE**REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel.
3. Remove Genset rear access panel.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

5. Disconnect rubber hose (Figure 4, Item 6) from fuel injector fuel rail (Figure 4, Item 1).
6. Disconnect rubber hose (Figure 4, Item 6) from fuel injector pump fuel rail (Figure 4, Item 11).

END OF TASK**REPLACEMENT**

1. Attach rubber hose (Figure 4, Item 6) to fuel injector fuel rail (Figure 4, Item 1).
2. Attach rubber hose (Figure 4, Item 6) to fuel injector pump fuel rail (Figure 4, Item 11).
3. Reconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
4. Install Genset rear access panel and install cargo restraints.
5. Start Genset in accordance with WP 00054, Genset Start Procedure.

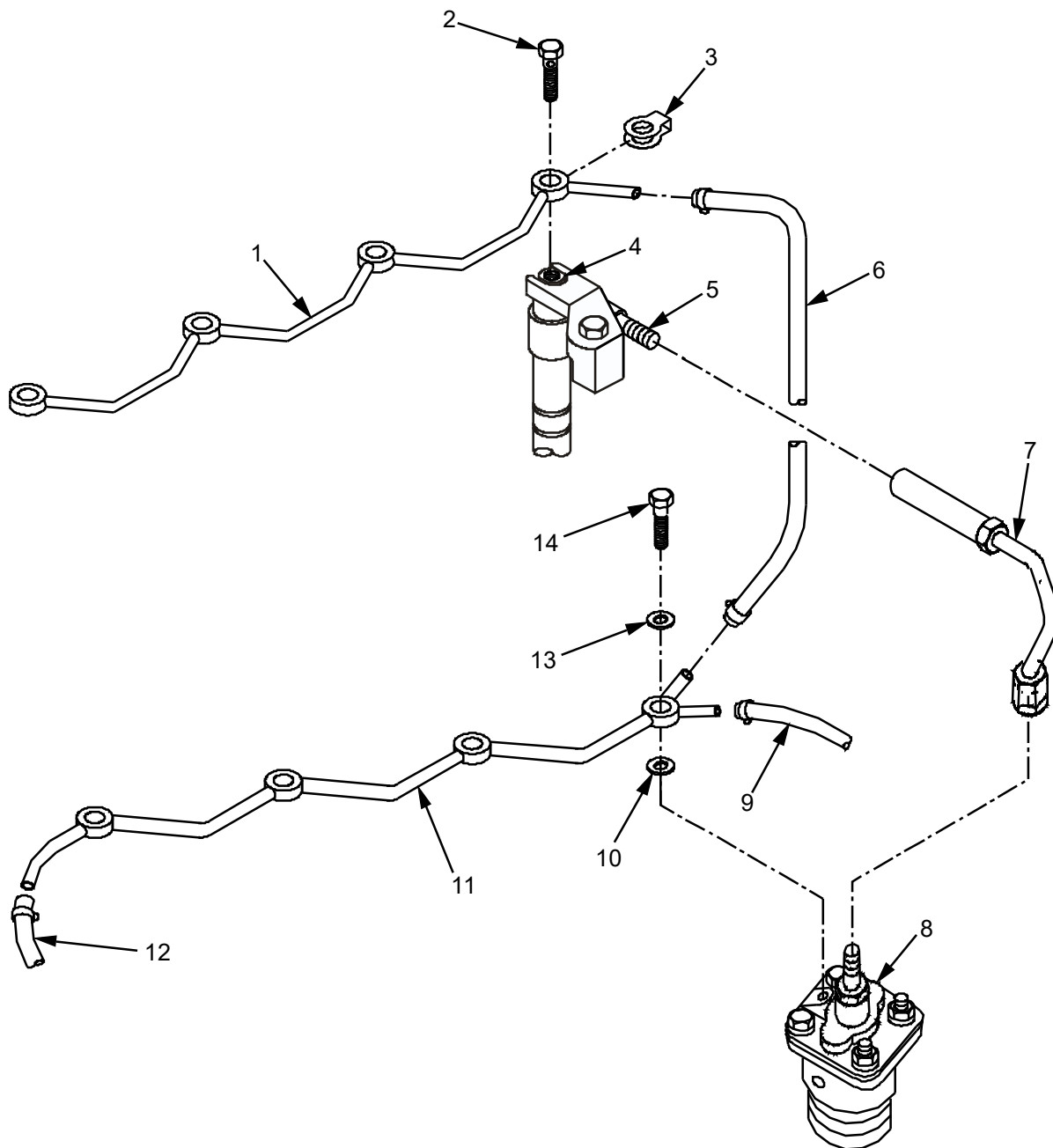


Figure 4. Fuel Injection System Lines - Replace.

END OF TASK

PRIME FUEL SYSTEM

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set, (WP 0132, Table 2, Item 4)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

NA

References

WP 0005

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

NOTE

To prime fuel system using auxiliary fuel source, refer to WP 0005
Fueling Genset from Auxiliary Fuel Source.

PRIME FUEL SYSTEM USING FUEL PUMP

1. Check fuel level, fill if required (Genset Fueling, WP 0005).
2. Open Genset control panel.
3. Turn Battery switch to ON.
4. Turn control panel power ON position, engine fuel pump will run.
5. Allow engine fuel pump to run for 15 to 30 seconds or until fuel pump becomes noticeable quieter (this signifies fuel is moving through fuel pump).
6. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET ENGINE BLOCK HEATER MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset engine block heater, engine block heater fuel pump, fuel filter, fuses and hoses

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

ENGINE BLOCK HEATER - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

engine block heater

Drain pan

Gloves, rubber (WP 0180, Table 2, Item 17)

Cloth, cleaning (WP 0180, Table 1, Item 12)

References

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

REMOVAL

1. Verify that Genset (Figure 1, Item 26) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Loosen but do not remove nut (Figure 1, Item 4) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 3). Remove exhaust pipe cap (Figure 1, Item 3) and set aside.
4. Remove and retain 20 bolts (Figure 1, Item 28), lock washers (Figure 1, Item 29), and flat washers (Figure 1, Item 30) that secure top access panel (Figure 1, Item 1) to Genset (Figure 1, Item 26). Remove top access panel (Figure 1, Item 1) and set aside. Discard lock washers (Figure 1, Item 29).
5. Remove front access panel (Figure 1, Item 5) and set aside.
6. Remove rear access panel (Figure 1, Item 27) and set aside.
7. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

REMOVAL – Continued**WARNING**

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

8. Loosen hose clamp (Figure 1, Item 21) on engine block heater fuel line (Figure 1, Item 18), at the fuel pump (Figure 1, Item 17) and disconnect fuel line (Figure 1, Item 18). Guide fuel line (Figure 1, Item 18) to spill bucket and allow fuel to drain out of system.
9. Loosen clamp (Figure 1, Item 20) that secures cool fluid input hose (Figure 1, Item 19) on the heater body (Figure 1, Item 14) and disconnect cool fluid input hose (Figure 1, Item 19).
10. Loosen clamp (Figure 1, Item 25) that secures fresh air intake hose (Figure 1, Item 24). Remove the fresh air intake hose (Figure 1, Item 24) from engine block heater body (Figure 1, Item 14).
11. Loosen clamp (Figure 1, Item 22) that secures hot output hose (Figure 1, Item 23) to the heater body (Figure 1, Item 14). Remove hot output hose (Figure 1, Item 23) from engine block heater body (Figure 1, Item 14).
12. Loosen clamp (Figure 1, Item 15) that secures exhaust hose (Figure 1, Item 16) to the heater body (Figure 1, Item 14). Remove the exhaust hose (Figure 1, Item 16) from engine block heater body (Figure 1, Item 14).
13. Remove engine block heater wiring harness access cover (Figure 1, Item 31) by carefully prying out on side of cover (Figure 1, Item 31).
14. Remove engine block heater external wiring harness connectors (Figure 1, Item 32).
15. Loosen four bolts (Figure 1, Item 10) that secure generator cover (Figure 1, Item 6). Remove generator cover and set aside.

WARNING

High AC voltage (208 VAC) and amperage present at electrical connections. Do not enter if Genset is operational. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

16. Remove and retain three nuts (Figure 1, Item 8), two flat washers (Figure 1, Item 7), and one large flat washer (Figure 1, Item 9) that secure engine block heater body (Figure 1, Item 14) to side panel.
17. Remove engine block heater body (Figure 1, Item 14), three threaded studs (Figure 1, Item 13), spacers (Figure 1, Item 12), and flat washers (Figure 1, Item 11).

END OF TASK

REPLACEMENT**NOTE**

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
 - Inspect engine block heater fuel filter. Ensure that fuel filter is not excessively dirty, worn or is in other need of servicing.
 - Inspect engine block heater fuel pump (Figure 1, Item 17). Ensure that fuel pump is not excessively damaged or otherwise appears to be unserviceable.
1. Insert three spacers (Figure 1, Item 12) and flat washers (Figure 1, Item 11) onto threaded studs (Figure 1, Item 13) on engine block heater body (Figure 1, Item 14).
 2. Align engine block heater body (Figure 1, Item 14) with proper holes on side panel and secure using two flat washers (Figure 1, Item 7), and one large flat washer (Figure 1, Item 9), and three nuts (Figure 1, Item 8).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

3. Connect engine block heater fuel line (Figure 1, Item 18) from fuel pump (Figure 1, Item 17) to engine block heater (Figure 1, Item 14). Secure with clamp (Figure 1, Item 21).
4. Connect cool fluid input hose (Figure 1, Item 19) to proper port on engine block heater (Figure 1, Item 14). Secure with hose clamp (Figure 1, Item 20).
5. Connect fresh air intake hose (Figure 1, Item 24) to proper port on engine block heater body (Figure 1, Item 14). Secure with clamp (Figure 1, Item 25).
6. Connect hot output hose (Figure 1, Item 23) to the engine block heater body (Figure 1, Item 14). Secure with clamp (Figure 1, Item 22).
7. Connect exhaust hose (Figure 1, Item 16) to proper port on heater body (Figure 1, Item 14) and secure with clamp (Figure 1, Item 15).
8. Clean up any excess spillage from base of Genset.
9. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
10. Install generator cover (Figure 1, Item 6) and secure using four bolts (Figure 1, Item 10).
11. Connect engine block heater external wiring harness (Figure 1, Item 32) and replace access cover (Figure 1, Item 31) on engine block heater.
12. Install top access panel (Figure 1, Item 1) onto Genset (Figure 1, Item 26) and secure using 20 bolts (Figure 1, Item 28), new lock washers (Figure 1, Item 29) and flat washers (Figure 1, Item 30).

REPLACEMENT - CONTINUED

13. Install exhaust pipe cap (Figure 1, Item 3) and tighten nut (Figure 1, Item 4) and bolt (Figure 1, Item 2) that secure exhaust pipe cap (Figure 1, Item 3).
14. Install access panels (Figure 1, Items 5 and 27).
15. Start Genset in accordance with WP 0005, Genset Start Procedure.

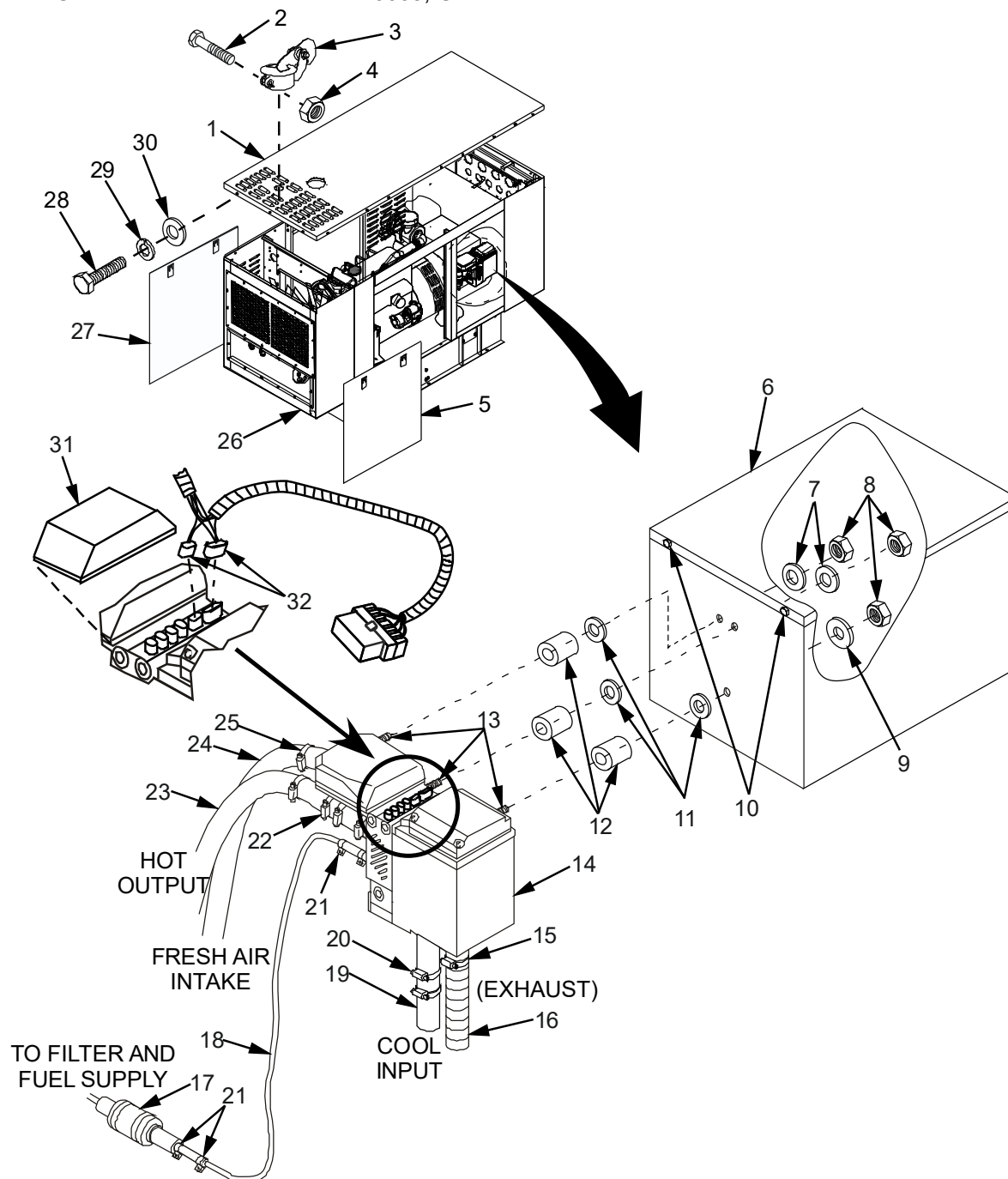


Figure 1. Engine Block Heater - Replace.

END OF TASK

ENGINE BLOCK HEATER FUEL PUMP AND FUEL FILTER - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**Fuel pump
Fuel filter
Drain pan
Cloth, cleaning (WP 0180, Table 1, Item 12)**References**

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

FUEL PUMP - REMOVAL

1. Verify that Genset (Figure 2, Item 2) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front and rear access panels (Figure 2, Items 1 and 3) of Genset (Figure 2, Item 2) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
5. Disconnect electrical cable (Figure 2, Item 6) from fuel pump (Figure 2, Item 11).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

6. Loosen hose clamp (Figure 2, Item 8) and disconnect fuel line (Figure 2, Item 7) (heater side) from fuel pump (Figure 2, Item 11). Guide fuel line (Figure 2, Item 7) to drain pan and allow fuel to drain.

FUEL PUMP - REMOVAL – Continued

7. Loosen second hose clamp (Figure 2, Item 12) and disconnect fuel line (Figure 2, Item 4) (filter side) from fuel pump (Figure 2, Item 11). Guide fuel line (Figure 2, Item 4) to drain pan and allow fuel to drain.
8. Remove and retain bolt (Figure 2, Item 10) and flat washer (Figure 2, Item 9) that secures fuel pump (Figure 2, Item 11) and clamp (Figure 2, Item 5) to frame (Figure 2, Item 17).
9. Remove fuel pump (Figure 2, Item 11) and clamp (Figure 2, Item 5).

END OF TASK**FUEL PUMP - REPLACEMENT****NOTE**

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect engine block heater fuel filter (Figure 2, Item 14). Ensure that fuel filter (Figure 2, Item 14) is not excessively dirty, worn or is in need of other servicing.

Verify that fuel pump (Figure 2, Item 11) is installed in the proper direction. Arrow should point towards fuel line going to engine block heater.

1. Install clamp (Figure 2, Item 5) onto fuel pump (Figure 2, Item 11). Secure assembly to frame (Figure 2, Item 17) with bolt (Figure 2, Item 10) and flat washer (Figure 2, Item 9).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

2. Connect fuel line (Figure 2, Item 4) (filter side) to fuel pump (Figure 2, Item 11) and secure with clamp (Figure 2, Item 12).
3. Connect fuel line (Figure 2, Item 7) (heater side) to fuel pump (Figure 2, Item 11) and secure with hose clamp (Figure 2, Item 8).
4. Connect electrical cable (Figure 2, Item 6) to fuel pump (Figure 2, Item 11).
5. Clean up any excess spillage from base of Genset (Figure 2, Item 2).
6. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
7. Install and secure front and rear access panels (Figure 2, Items 1 and 3).
8. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK

FUEL FILTER - REMOVAL

1. Verify that Genset (Figure 2, Item 2) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Remove front and rear access panels (Figure 2, Items 1 and 3) of Genset (Figure 2, Items 2) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

5. Loosen hose clamp (Figure 2, Item 13) and disconnect fuel line (Figure 2, Item 4) (fuel pump side) from fuel filter (Figure 2, Item 14).

NOTE

When performing the following step do not let fuel line fall through frame.

6. Loosen second hose clamp (Figure 2, Item 15) and disconnect fuel line (Figure 2, Item 16) (fuel tank side) from fuel filter (Figure 2, Item 14).

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect engine block heater fuel pump (Figure 2, Item 11). Ensure that the fuel pump (Figure 2, Item 11) is not excessively damaged or otherwise appears to be unserviceable.

When performing the following steps verify that fuel filter (Figure 2, Item 14) is installed in the proper direction. Arrow should point towards fuel line going to engine block heater.

1. Connect fuel line (Figure 2, Item 16) (fuel tank side) to fuel filter (Figure 2, Item 14) and secure with hose clamp (Figure 2, Item 15).

REPLACEMENT Continued

2. Connect fuel line (Figure 2, Item 4) (fuel pump side) to fuel filter (Figure 2, Item 14) and secure with hose clamp (Figure 2, Item 13).
3. Clean up any excess spillage from base of Genset.
4. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
5. Install and secure front and rear access panels (Figure 2, Items 1 and 3).
6. Install cargo restraints (not shown).
7. Start Genset in accordance with WP 0005, Genset Start Procedure.

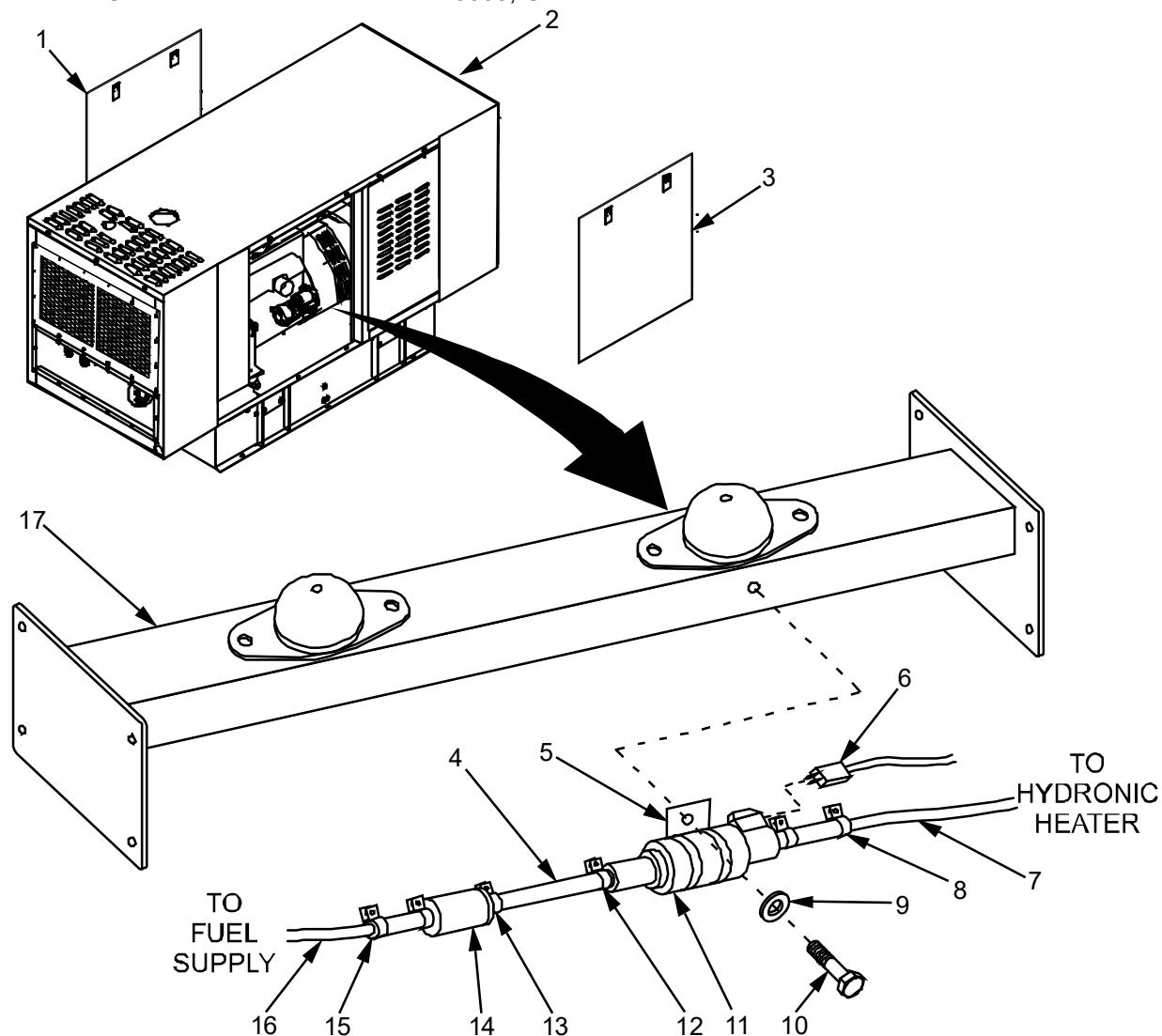


Figure 2. Engine Block Heater Fuel Pump and Fuel Filter - Replace.

END OF TASK

ENGINE BLOCK HEATER HOSE - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

engine block heater hoses

Drain pan

Strap, tie-down (WP 0180, Table 1, Items 42 to 44)

Cloth, cleaning (WP 0180, Table 1, Item 12)

References

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

AIR INTAKE HOSE**REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Loosen but do not remove nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secures exhaust pipe cap (Figure 3, Item 6). Remove exhaust pipe cap (Figure 3, Item 6) and set aside.
4. Remove and retain 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2), and flat washers (Figure 3, Item 3) that secure top access panel (Figure 3, Item 4) to Genset (Figure 3, Item 20). Remove top access panel (Figure 3, Item 4) and set aside. Discard lock washers (Figure 3, Item 2).
5. Remove front and rear access panels (Figure 3, Items 8 and 21) of Genset and set aside.
6. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

REMOVAL – Continued**WARNING**

Cut end of air intake is extremely sharp. Exercise care to prevent injury.

7. Cut zip ties that secure air intake hose, wiring harness and coolant hoses together.
8. Loosen air intake hose clamp (Figure 3, Item 9) where it connects at the front of the engine block heater (Figure 3, Item 10).
9. Grasp air intake hose (Figure 3, Item 19) and using a twisting motion pull away from the engine block heater (Figure 3, Item 10).
10. Remove air intake hose from enclosure and set aside.

END OF TASK**REPLACEMENT**

1. Position air intake hose (Figure 3, Item 19) so that cut end is located near air inlet on the engine block heater (Figure 3, Item 10).
2. Using a twisting motion slide the air intake hose (Figure 3, Item 19) over the intake port on the front of the engine block heater (Figure 3, Item 10) approximately 1 inch.
3. Slide air intake hose clamp (Figure 3, Item 9) into position.
4. Tighten air intake hose clamp (Figure 3, Item 9).
5. Secure air intake hose, wiring harness and coolant hoses together with zip ties.
6. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
7. Install top access panel (Figure 3, Item 4) onto Genset (Figure 3, Item 20) and secure using 20 bolts (Figure 3, Item 1), new lock washers (Figure 3, Item 2) and flat washers (Figure 3, Item 3).
8. Install exhaust pipe cap (Figure 3, Item 6) and tighten nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secure exhaust pipe cap (Figure 3, Item 6).
9. Install front and rear access panels (Figure 3, Items 8 and 21) and install cargo restraints (not shown).
10. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK

EXHAUST HOSE**REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Loosen but do not remove nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secures exhaust pipe cap (Figure 3, Item 6). Remove exhaust pipe cap (Figure 3, Item 6) and set aside.
4. Remove and retain 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2), and flat washers (Figure 3, Item 3) that secure top access panel (Figure 3, Item 4) to Genset (Figure 3, Item 20). Remove top access panel (Figure 3, Item 4) and set aside. Discard lock washers (Figure 3, Item 2).
5. Remove front and rear access panels (Figure 3, Items 8 and 21) of Genset and set aside.
6. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

CAUTION

If heater has been operating exhaust may be extremely hot. Allow time to cool before removing.

Cut end of exhaust is extremely sharp. Exercise care to prevent injury.

7. Loosen exhaust hose clamp (Figure 3, Item 11) at base of engine block heater (Figure 3, Item 10).
8. Grasp exhaust hose (Figure 3, Item 12) and using a twisting motion pull down on hose.
9. Remove exhaust hose from enclosure and set aside.

END OF TASK**REPLACEMENT**

1. Position exhaust hose (Figure 3, Item 12) so that it's aligned with the exhaust port of the engine block heater (Figure 3, Item 10).
2. Using a twisting motion slide the exhaust hose over exhaust port approximately 1 inch.
3. Slide exhaust hose clamp (Figure 3, Item 11) into position.
4. Tighten exhaust hose clamp.
5. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
6. Install top access panel (Figure 3, Item 4) onto Genset (Figure 3, Item 20) and secure using 20 bolts (Figure 3, Item 1), new lock washers (Figure 3, Item 2), and flat washers (Figure 3, Item 3).
7. Install exhaust pipe cap (Figure 3, Item 6) and tighten nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secure exhaust pipe cap (Figure 3, Item 6).

REPLACEMENT - Continued

8. Install front and rear access panels (Figure 3, Items 8 and 21).
9. Install cargo restraints (not shown).
10. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK**FUEL HOSE****REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Loosen but do not remove nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secures exhaust pipe cap (Figure 3, Item 6). Remove exhaust pipe cap (Figure 3, Item 6) and set aside.
4. Remove and retain 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2), and flat washers (Figure 3, Item 3) that secure top access panel (Figure 3, Item 4) to Genset (Figure 3, Item 20). Remove top access panel (Figure 3, Item 4) and set aside. Discard lock washers (Figure 3, Item 2).
5. Remove front and rear access panels (Figure 3, Items 8 and 21) of Genset and set aside.
6. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.

NOTE

Fuel lines may still have fuel present or be under pressure. Care must be taken to prevent fuel from spilling and to avoid exposure of skin to diesel fuel.

7. Using either a flat tip screw driver or socket and ratchet, loosen the fuel hose clamp (Figure 3, Item 15) at the engine block heater (Figure 3, Item 10). Repeat for other end of fuel hose.
8. Place a drip pan or absorbent pad under the connection to be broken in case of spillage.
9. Pull the fuel hose (Figure 3, Item 16) away from the connection using a twisting motion until it comes free. Repeat for other end of fuel hose.
10. Remove the fuel hose clamps if they are to be reused and discard hose.

END OF TASK

REPLACEMENT**NOTE**

Ensure that replacement hose is the same length and diameter of the original hose.

Ensure that the hose clamps are placed on the hose in such a way that the screws will be accessible once slid into place.

1. Place hose clamps (Figure 3, Item 15) onto replacement fuel hose (Figure 3, Item 16) loosely and slide to center of hose.
2. Most connections have a ridge built into them to facilitate a good seal when the hose clamp is tightened down. Identify the location of the ridge on the first side.
3. Using a twisting motion slide the fuel hose (Figure 3, Item 16) onto fuel port of engine block heater (Figure 3, Item 10). Ensure hose is slid back far enough.
4. Slide fuel hose clamp (Figure 3, Item 15) into position. Repeat for other end of fuel hose.
5. Ensure hose is not twisted.
6. Tighten down hose clamp (Figure 3, Item 15) using flat tip screwdriver or socket and ratchet, until hose clamp begins to press into hose. Repeat for other end of fuel hose.

NOTE

Over tightening the hose clamp can result in damage to the hose and premature failure.

7. Clean up any excess spillage from base of the Genset.
8. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
9. Install top access panel (Figure 3, Item 4) onto Genset (Figure 3, Item 20) and secure using 20 bolts (Figure 3, Item 1), new lock washers (Figure 3, Item 2), and flat washers (Figure 3, Item 3).
10. Install exhaust pipe cap (Figure 3, Item 6) and tighten nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secure exhaust pipe cap (Figure 3, Item 6).
11. Install front and rear access panels (Figure 3, Items 8 and 21) and install cargo restraints (not shown).
12. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF TASK

INPUT and OUTPUT COOLANT HOSE**REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to rear access panel of Genset.
3. Loosen but do not remove nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secures exhaust pipe cap (Figure 3, Item 6). Remove exhaust pipe cap (Figure 3, Item 6) and set aside.
4. Remove and retain 20 bolts (Figure 3, Item 1), lock washers (Figure 3, Item 2), and flat washers (Figure 3, Item 3) that secure top access panel (Figure 3, Item 4) to Genset (Figure 3, Item 20). Remove top access panel (Figure 3, Item 4) and set aside. Discard lock washers (Figure 3, Item 2).
5. Remove front and rear access panels (Figure 3, Items 8 and 21) of Genset and set aside.
6. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
7. Identify coolant hose to be replaced (Figure 3, Item 13 or 19).
8. Drain engine coolant in accordance with WP 0070.
9. Cut zip ties that secure air intake hose, wiring harness and coolant hoses together.
10. Using either a flat tip screw driver or a socket and ratchet, loosen the coolant hose clamp (Figure 3, Item 9 or 14) on the engine block heater (Figure 3, Item 10). Repeat for other end of coolant hose.
11. Place a drip pan or absorbent pad under the connection to be broken in case of spillage.
12. Pull the coolant hose (Figure 3, Item 13 or 18) away from the connection using a twisting motion until it comes free. Repeat for other end of coolant hose.
13. Remove the hose clamps (Figure 3, Item 14 or 17) if they are to be reused and discard hose.

END OF TASK**REPLACEMENT****NOTE**

Ensure that replacement hose is the same length and diameter of the original hose.

1. Place hose clamps (Figure 3, Items 14 & 17) onto replacement hose loosely and slide to center of hose.

NOTE

Ensure that the hose clamps are placed on the hose in such a way that the screws will be accessible once slid into place.

2. Most connections have a ridge built into them to facilitate a good seal when the hose clamp is tightened down. Identify the location of the ridge on the first side.

REPLACEMENT – Continued

3. Using a twisting motion slide the coolant hose (Figure 3, Item 13 or 18) onto the coolant ports of the engine block heater (Figure 3, Item 10). Ensure hose is slid back far enough.
4. Slide coolant hose clamp (Figure 3, Item 9 or 14) down into position. Repeat for other end of hose.
5. Ensure hose is not twisted.
6. Tighten down hose clamps (Figure 3, Item 17 or 19) using flat tip screwdriver or socket and ratchet, until hose clamp begins to press into hose. Repeat for other end of coolant hose.

NOTE

Over tightening the hose clamp can result in damage to the coolant hose and premature failure.

7. Refill coolant in accordance with WP 0020.
8. Clean up any excess spillage from base of the Genset.
9. Secure air intake hose, wiring harness and coolant hoses together with zip ties.
10. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
11. Install top access panel (Figure 3, Item 4) onto Genset (Figure 3, Item 20) and secure using 20 bolts (Figure 3, Item 1), new lock washers (Figure 3, Item 2), and flat washers (Figure 3, Item 3).
12. Install exhaust pipe cap (Figure 3, Item 6) and tighten nut (Figure 3, Item 7) and bolt (Figure 3, Item 5) that secure exhaust pipe cap (Figure 3, Item 6).
13. Install and secure front and rear access panels (Figure 3, Items 8 and 21).
14. Install cargo restraints (not shown).
15. Start Genset in accordance with WP 0005, Genset Start Procedure.

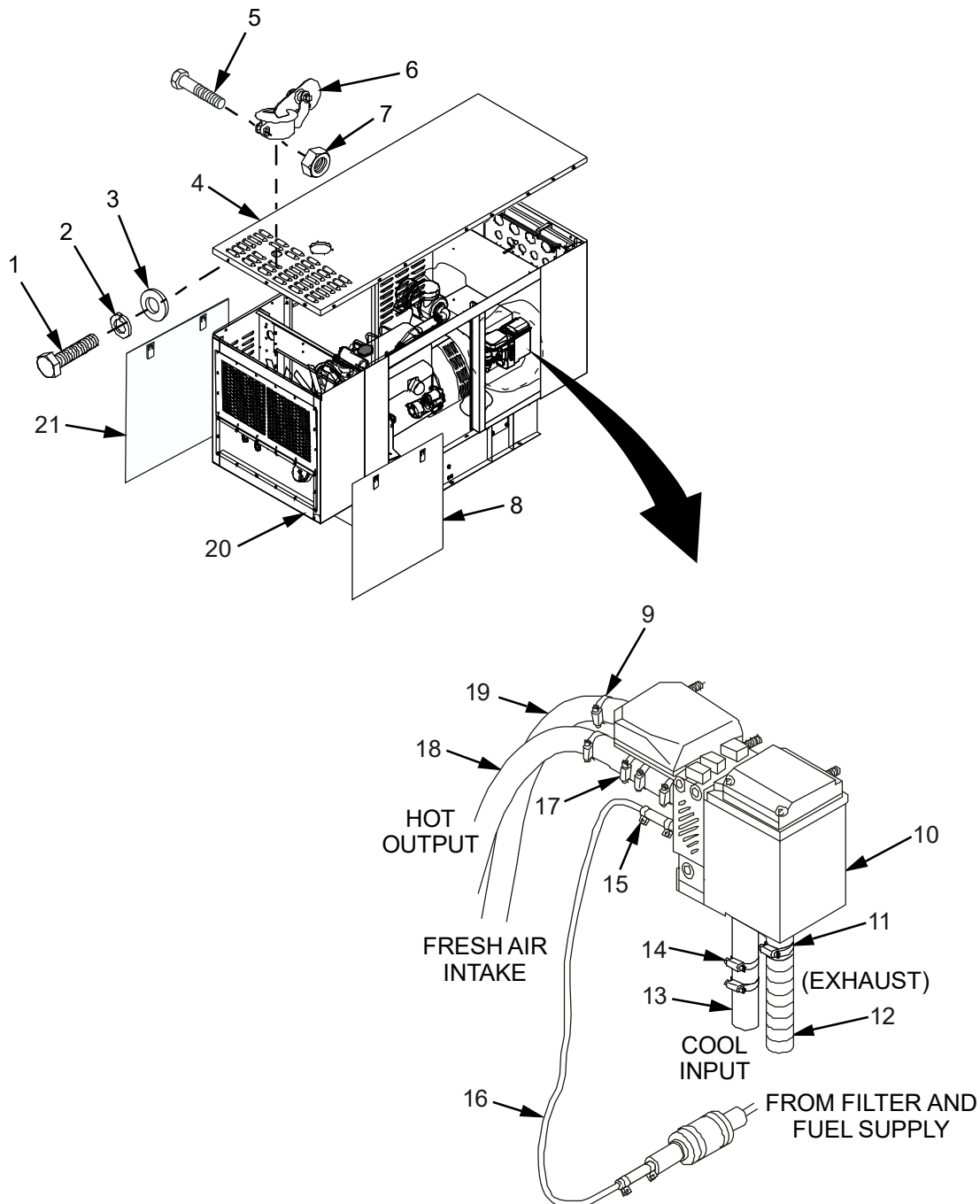


Figure 3. Engine Block Heater Hose - Replace.

END OF TASK

ENGINE BLOCK HEATER FUSE - REPLACE

INITIAL SETUP:**Materials/Parts****References**

WP 0005

Personnel Required

Power Generation Equipment Mechanic, MOS 91D (1)

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit, (WP 0132, Table 2, Item 1)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**Materials/Parts**

Fuse

References

WP 0005

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing the following service.

REMOVAL

1. Verify that Genset (Figure 4, Item 1) has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove front access door (Figure 4, Item 2) on Genset (Figure 4, Item 1) and set aside.
3. Locate fuse holder (Figure 4, Item 4) on engine block heater (Figure 4, Item 3) and open cover.
4. Identify and remove bad fuse (Figure 4, Items 5 and 6).

END OF TASK

REPLACEMENT

1. Replace fuse (Figure 4, Items 5 and 6) with proper type and value.
2. Close fuse holder (Figure 4, Item 4).
3. Install access door (Figure 4, Items 2) on Genset (Figure 4, Item 1).
4. Start Genset/engine block heater in accordance with WP 0005, Genset Start Procedure and check engine block heater for leaks.

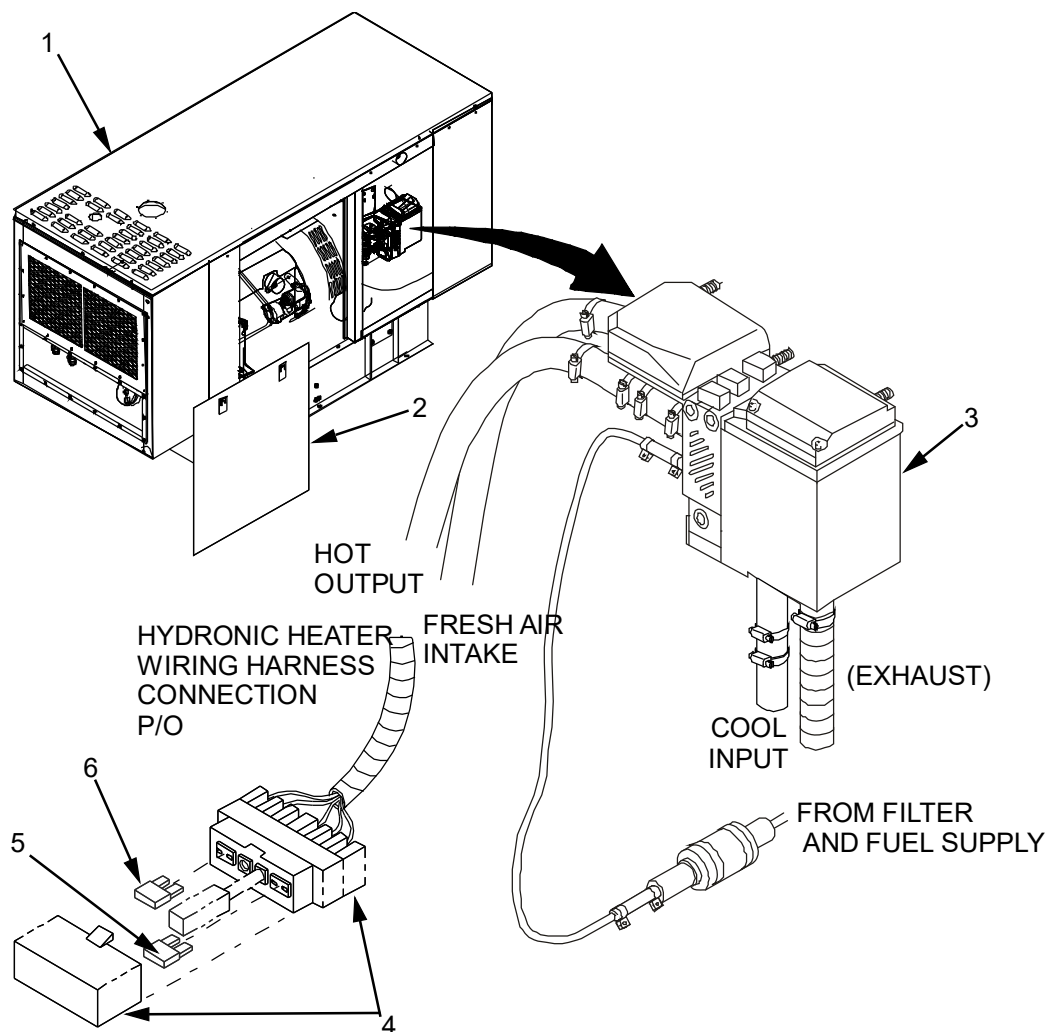


Figure 4. Engine Block Heater Fuse - Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET (ENGINE-GENERATOR) MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of the Genset (including enclosure), engine generator assembly (EGA) and procedure on separation of Engine from Generator. If necessary, refer to WP 0004 for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to Figures FO-1 through FO-10 for electrical schematics and wiring diagrams.

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

GENSET (including enclosure) - REPLACE

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)
Lifting device (Hoist/Tow truck/Crane)
Chains/straps
Gloves

Materials/Parts

Support lumber, (4x4, approx. 42", 4 ea.)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005, WP 0020, WP 0069,
WP 0052, WP 0056, WP 0050,
WP 0077

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

The Genset assembly for the HP-2C/185 UST Trailer weighs 1481 lb (673.18 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the Genset without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the Genset is removed, do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to Genset.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to cool down.

Do not enter Genset when operational. Exposed moving parts (i.e. fan blade) present. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

To avoid possibility of counter balance, ensure that tongue jack and jack assemblies are lowered to ground level to support trailer.

REMOVAL

1. Prior to performing the following steps ensure that:
 - Genset has been shut down in accordance with WP 0005, Genset Shut Down Procedure.
 - Genset is at ambient temperature.
 - All cables have been disconnected from power distribution panel on Genset.
 - If applicable, disconnect auxiliary fuel lines from Genset.
 - Fuel has been drained (WP 0050).
 - Trailer is level.
 - Wheels are chocked.
 - All bags have been removed, trailer and immediate area around Genset is free and clear of items (i.e., storage bags, ground cables, etc.).
 - Ample room to operate lifting device, maneuver and place Genset is present.
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 1, Item 4) of Genset (Figure 1, Item 10).
3. Remove access doors (Figure 1, Items 4 and 9) of Genset (Figure 1, Item 10) and set aside.
4. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
5. Disconnect ground cable from external ground stud on Genset (Figure 1, Item 10).
6. Disconnect internal chassis ground from Genset (Figure 1, Item 10) and trailer ground.
7. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 1). Remove exhaust pipe cap (Figure 1, Item 1) and set aside.
8. Remove and retain 20 bolts (Figure 1, Item 11), lock washers (Figure 1, Item 12), and flat washers (Figure 1, Item 13) that secure top access panel (Figure 1, Item 14) to Genset (Figure 1, Item 10). Remove top access panel (Figure 1, Item 14) and set aside. Discard lock washers (Figure 1, Item 12).
9. Remove and retain six bolts (Figure 1, Item 7), six lock nuts (Figure 1, Item 6), and twelve flat washers (Figure 1, Item 5) from bottom of Genset (Figure 1, Item 10). Discard lock nuts (Figure 1, Item 6).
10. Attach chain/sling to the two lift points (Figure 1, Items 15 and 16). One lift point (Figure 1, Item 15) is located on the engine and one lift point (Figure 1, Item 16) is located on the generator.

NOTE

When performing the following step, ensure that area where Genset is to be placed is dry and level. Ensure that supports allow adequate room below Genset so that no items on bottom become damaged.

11. Place supports (i.e., treated lumber) along ground for Genset (Figure 1, Item 10) to be placed on once removed from trailer.

REMOVAL – Continued**CAUTION**

When performing the following step, guides should be observant of Genset to ensure no pieces from Genset and/or trailer get caught while lifting is in process.

When performing the following step, guides should be observant of Genset to ensure supports are properly placed and that nothing on Genset gets damaged when placing Genset onto supports.

12. Using a suitable lifting device, raise Genset (Figure 1, Item 10) off of trailer and place on supports. Once Genset (Figure 1, Item 10) is safely lowered, remove chain/sling from lift points.

END OF TASK**REPLACEMENT****NOTE**

It is assumed that the Genset has been removed from any shipping crates and is "loose" waiting to be installed onto the HP-2C/185 UST Trailer.

1. Remove access doors (Figure 1, Items 4 and 9) of Genset (Figure 1, Item 10) and set aside.
2. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
3. Loosen but do not remove nut (Figure 1, Item 3) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 1). Remove exhaust pipe cap (Figure 1, Item 1) and set aside.
4. Remove and retain 20 bolts (Figure 1, Item 11), lock washers (Figure 1, Item 12), and flat washers (Figure 1, Item 13) that secure top access panel (Figure 1, Item 14) to Genset (Figure 1, Item 10). Remove top access panel (Figure 1, Item 14) and set aside. Discard lock washers (Figure 1, Item 12).
5. Attach chain/sling to the two lift points (Figure 1, Items 15 and 16). One lift point (Figure 1, Item 15) is located on the engine and one lift point (Figure 1, Item 16) is located on the generator.

CAUTION

When performing the following step, guides should be observant of Genset to ensure proper positioning of Genset and that no pieces from Genset and/or trailer get caught while lowering Genset onto trailer.

6. Using a suitable lifting device, raise Genset (Figure 1, Item 10). Insert three bolts (Figure 1, Item 7) and three washers (Figure 1, Item 5) in rear mounting holes of Genset enclosure to be used as guides for mounting holes while lowering Genset enclosure onto trailer bed.
7. With Genset (Figure 1, Item 10) in place on trailer, insert remaining three bolts (Figure 1, Item 7) and washers (Figure 1, Item 5) in front mounting holes of Genset enclosure.
8. Install six new lock nuts (Figure 1, Item 6) and flat washers (Figure 1, Item 5) and secure Genset (Figure 1, Item 10) to trailer.

REPLACEMENT - Continued

9. Once Genset (Figure 1, Item 10) is secured to trailer, remove chain/sling from two lift points (Figure 1, Items 15 and 16).
10. Remove batteries from old enclosure and install on new enclosure as per WP 0056.
11. Reconnect ground cable to external ground stud on Genset (Figure 1, Item 10).
12. Reconnect internal chassis ground to Genset (Figure 1, Item 10) and trailer ground.
13. Replace top access panel (Figure 1, Item 14) onto Genset and secure using 20 bolts (Figure 1, Item 11), new lock washers (Figure 1, Item 12) and flat washers (Figure 1, Item 13).
14. Install exhaust pipe cap (Figure 1, Item 1) and tighten nut (Figure 1, Item 3) and bolt (Figure 1, Item 2) that secures exhaust pipe cap (Figure 1, Item 1).
15. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
16. Fill tank with fuel and check for leaks.
17. Perform all necessary PMCS (WP 0020 and WP 0052) on engine.
18. Prime engine as described in WP 0077 and start Genset in accordance with WP 0005, Genset Start Procedure.
19. Install two access panels (Figure 1, Items 4 and 9).
20. Install cargo restraints (not shown).

END OF TASK

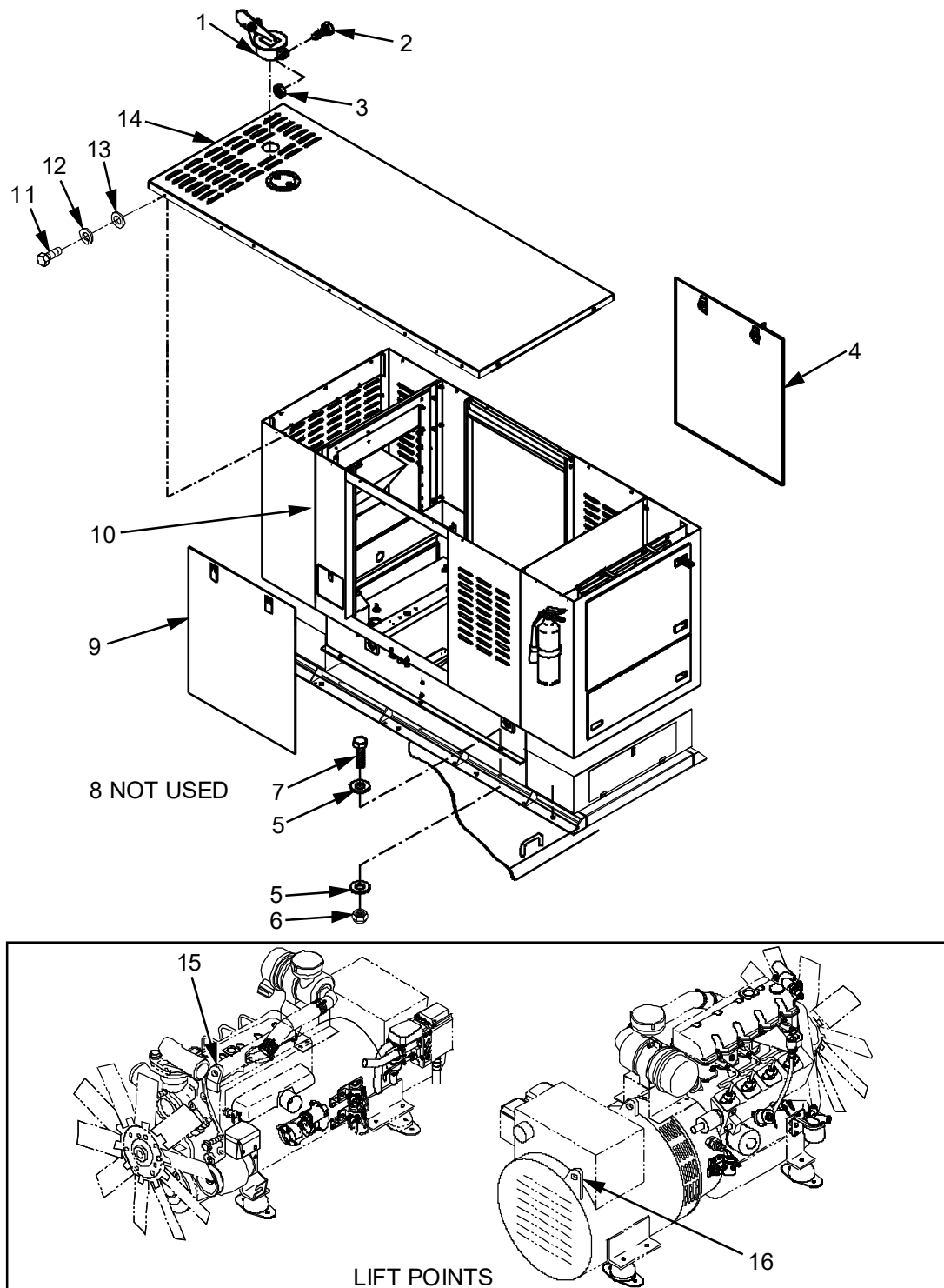


Figure 1. Genset - Replace.

END OF TASK

ENGINE GENERATOR ASSEMBLY - REPLACE

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set (WP 0132, Table 2, Item 4)
Lifting device (Hoist/Tow truck/Crane)
Chains/straps
Drain pans
Gloves

Materials/Parts

Anti-Freeze (WP 0180, Table 1, Item 2)
Cloth, cleaning (WP 0180, Table 1, Item 12)
Gloves, Rubber (WP 0180, Table 1, Item 17)
Oil (WP 0180, Table 1, Items 25 or 26)
Tape, Antisiezing (WP 0180, Table 1, Item 45)
Strap, tie down (WP 0180, Table 1, Items 42 to 46)
Cardboard/plywood

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005, WP 0069, WP 0052,
WP 0056, WP 0045, WP 0050,
WP 0070, WP 0050, WP 0052,
WP 0053, WP 0054, WP 0055,
WP 0077, FO-1 through FO-10

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

REMOVAL**WARNING**

The Engine Generator Assembly (EGA) weighs 680 lb (309.1 kg). The engine weighs 344 lb (156.36 kg) and the generator weighs 336 lb (152.72 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the EGA is removed, do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to EGA.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to cool down.

Do not enter Genset when operational. Exposed moving parts (i.e. fan blade) present. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

To avoid possibility of counter balance, ensure that tongue jack and jack assemblies are lowered to ground level to support trailer.

Preparation

1. Prior to performing the following steps ensure that:
 - Genset has been shut down in accordance with WP 0005, Genset Shut Down Procedure.
 - Genset is at ambient temperature.
 - Trailer is level.
 - Wheels are chocked.
 - All electrical cables have been disconnected from power distribution panel on Genset.
 - If applicable, auxiliary fuel lines have been disconnected from Genset.
 - All bags have been removed trailer and immediate area around Genset is free and clear of Items (i.e., storage bags, ground cables, etc.).
 - Ample room to operate lifting device, maneuver, and place Genset is present.
2. Remove cargo restraints (not shown) to gain access to rear access panel (Figure 2, Item 5) of Genset (Figure 2, Item 7).
3. Remove access doors (Figure 2, Items 5 and 6) of Genset (Figure 2, Item 7) and set aside.
4. Loosen but do not remove nut (Figure 2, Item 3) and bolt (Figure 2, Item 2) that secures exhaust pipe cap (Figure 2, Item 1). Remove exhaust pipe cap (Figure 2, Item 1) and set aside.
5. Remove and retain 20 bolts (Figure 2, Item 12), lock washers (Figure 2, Item 13), and flat washers (Figure 2, Item 14) that secure top access panel (Figure 2, Item 4) to Genset (Figure 2, Item 7). Remove top access panel (Figure 2, Item 4) and set aside. Discard lock washers (Figure 2, Item 13).
6. Remove and retain 16 bolts (Figure 2, Item 11), lock washers (Figure 2, Item 10), and flat washers (Figure 2, Item 9) that secure radiator access panel (Figure 2, Item 8) to Genset (Figure 2, Item 7). Remove radiator access panel (Figure 2, Item 8) and set aside. Discard lock washers (Figure 2, Item 10).

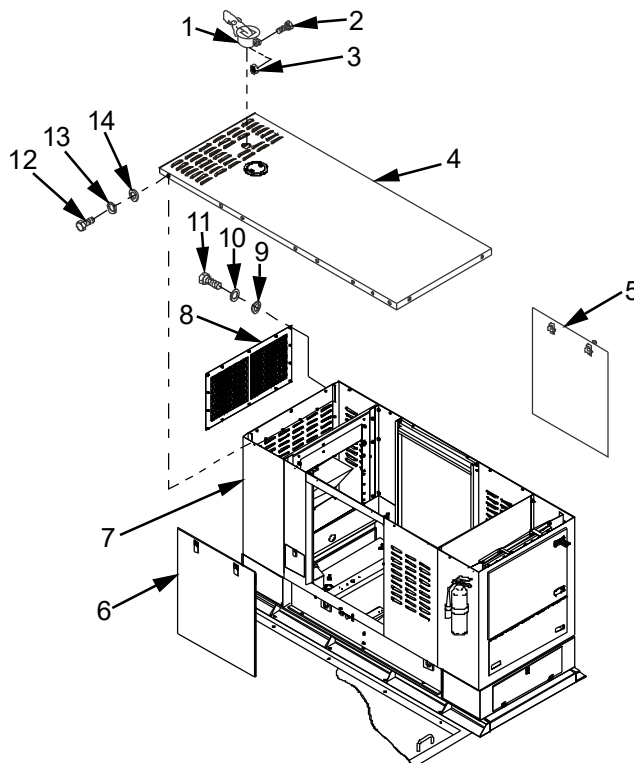


Figure 2. Preparation for Engine/Generator - Replace.

END OF TASK

Removing Electrical Connections**NOTE**

Once steps 1 through 3 have been completed, cover battery terminals with a non-conductive material (i.e., clean rag or towel) to prevent possibility of accidental shorting.

1. Disconnect battery ground cable (black) (Figure 3, Item 12) from battery negative (–) terminal.
2. Disconnect starter cable (Figure 3, Item 10), engine block heater cable (Figure 3, Item 11) and J6 cable (Figure 3, Item 9) from positive battery terminal (WP 0056).
3. Disconnect fuse (Figure 3, Item 13) from battery terminals (WP 0056).
4. Disconnect battery cable (red) (Figure 3, Item 10) from starter (Figure 3, Item 17). Follow cable around engine. Remove and retain any cable clamps and associated hardware securing the cable.
5. Disconnect ground cable (black) (Figure 3, Item 12) from engine. Follow cable around engine. Remove and retain any cable clamps and associated hardware securing the cable.
6. Loosen four bolts (Figure 3, Item 8) that secure generator cable access cover (Figure 3, Item 7). Remove generator cover (Figure 3, Item 7) and set aside.
7. Remove and retain four nuts (Figure 3, Item 3) and lock washers (Figure 3, Item 4) that secure wires (Figure 3, Item 2) (red, white, blue, and black) to output side of generator. Discard lock washers (Figure 3, Item 4).

NOTE

Prior to performing the following steps, ensure that four wires (red, white, blue, and black) and associated terminals are appropriately marked for easy connection during replacement.

If necessary refer to schematics, Figures FO-1 through FO-10.

When performing step 8 do not remove black wires going to interior generator coil.

8. Mark and disconnect four wires (Figure 3, Item 2) (red, white, blue, and black) from output side of generator, routed through harness to circuit breaker CB5 on barrier panel.
9. Install four nuts (Figure 3, Item 3) and new lock washers (Figure 3, Item 4) back onto terminals of generator securing black generator coil wires to terminal.
10. Remove control panel and circuit breaker panel as a whole unit as described in WP 0077, Steps 3 – 12 and set aside.

NOTE

If necessary refer to Table 1 or schematics, Figures FO-1 through FO-10.

11. Mark and disconnect three wires (Figure 3, Item 2) (red, blue, and black) from input side of circuit breaker CB7 of barrier panel.

Removing Electrical Connections – Continued

12. Mark and disconnect white wire from neutral terminal block (PTB2) of barrier panel.
13. Mark and disconnect green wire from ground terminal block (GB) of barrier panel.

Table 1. Generator to Barrier Panel Wiring Connections.

Wire Color	Barrier Panel Connection/Identifier	Generator Connection
Black	171-CB7-1	T7
Red	172-CB7-3	T8
Blue	173-CB7-5	T9
White	177-PTB2-15	T4,T5,T6
Green	178-GB-2	GGL (Generator junction box)

14. Remove jam nut (Figure 3, Item 24) securing conduit (Figure 3, Item 1) to barrier panel (Figure 3, Item 25). Disconnect conduit (Figure 3, Item 1) from barrier panel (Figure 3, Item 25).

CAUTION

To avoid damage, pull wires through conduit from barrier panel to generator/engine side.

15. Pull five wires (Figure 3, Item 2) (red, white, blue, black and green) disconnected in previous steps through conduit (Figure 3, Item 1).
16. Disconnect CM1 from CF1 (on barrier panel side). Pull harness from barrier panel to generator/engine side.
17. Mark and disconnect two terminals (Figure 3, Item 23).
18. Remove and retain four bolts (Figure 3, Item 22) securing cable box (Figure 3, Item 21) to generator and lay cable box back out of the way.
19. Remove and retain hardware securing ground cable to GROUND on frame of Genset. Disconnect ground cable and replace hardware.

END OF TASK

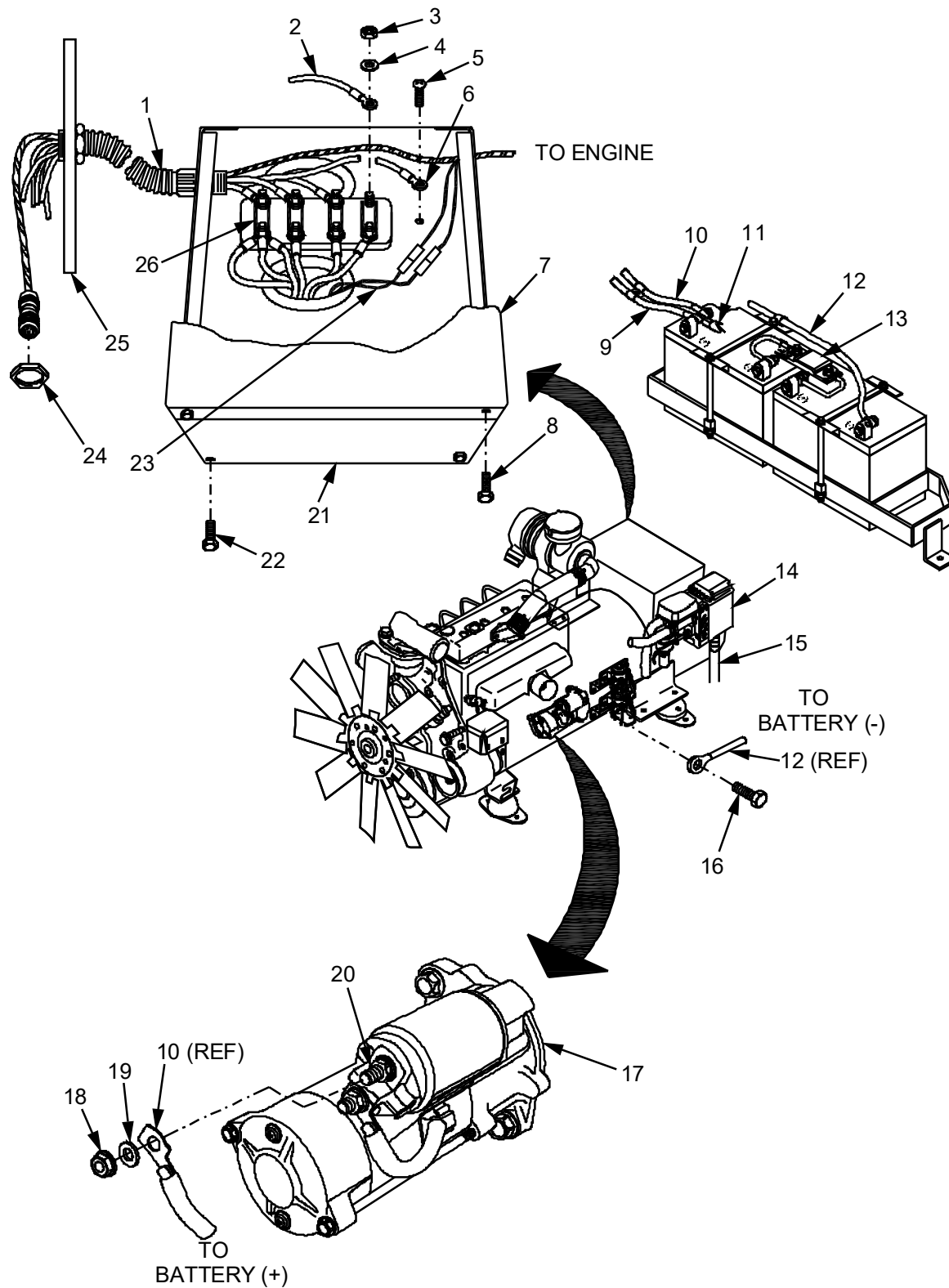


Figure 3. Electrical and Engine block Heater Connections for Engine/Generator - Replace.

END OF TASK

Removing Oil Connections**WARNING**

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under oil pan.

1. Drain engine oil from LUBE OIL plug (Figure 4, Item 10) as described in WP 0045.
2. Disconnect drain line (Figure 4, Item 1) from bottom of oil pan (Figure 4, Item 3) and set aside.
3. Plug oil pan (Figure 4, Item 3).

END OF TASK**Removing Fuel Line Connections (WORK IN PROGRESS)****NOTE**

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under fuel tank and associated lines being removed.

1. Drain fuel from fuel tank as described in WP 0050.
2. Remove and retain two mounting bolts (Figure 4, Item 7) and flat washers (Figure 4, Item 6) from bracket (Figure 4, Item 5) supporting the fuel line heater (Figure 4, Item 8) from the side of the engine.
3. Pull back the protective cover from fuel line heater (Figure 4, Item 9) and remove heat shrink. Mark and disconnect fuel heater electrical connections.
4. Disconnect the inlet fuel line (Figure 4, Item 4) running from fuel line heater (Figure 4, Item 8) to the fuel filter. If necessary, move fuel line heater below I-beam out of the way (WP 0066).
5. Disconnect the engine return fuel line (Figure 4, Item 2) from the fuel injector rail. If necessary, cut any strap ties securing engine return fuel line and move out of the way.

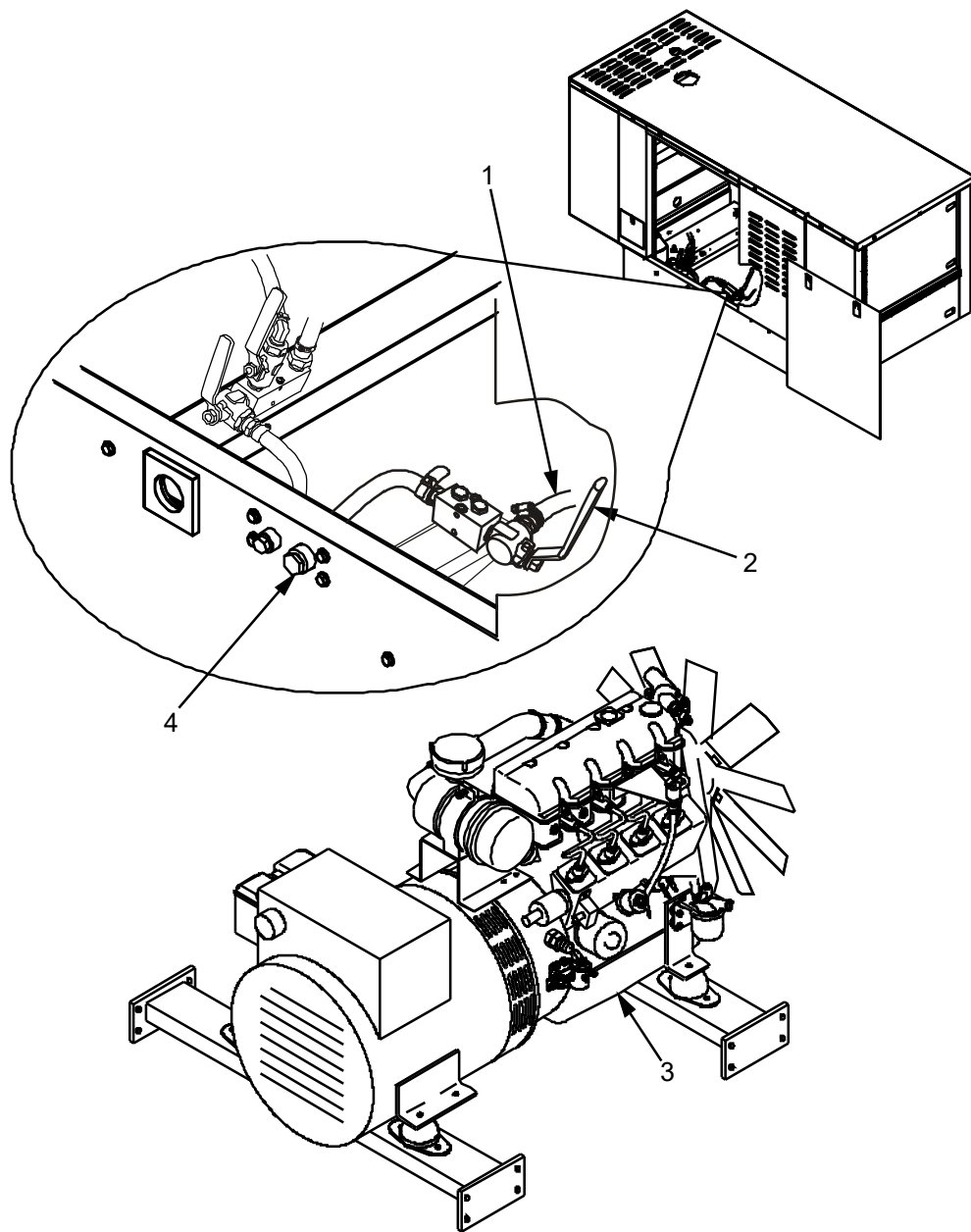


Figure 4. Oil and Fuel Preparation for Engine/Generator - Replace.

END OF TASK

Removing Radiator Connections**WARNING**

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under hoses and lines being removed.

1. Drain coolant (WP 0070) from Coolant Drain plug (Figure 5, Item 16).
2. Disconnect upper radiator hoses (Figure 5, Item 1) from radiator (Figure 5, Item 2) and water pump (WP 0050).
3. Disconnect lower radiator hose (Figure 5, Item 3) from engine and radiator (Figure 5, Item 2) (WP 0050).
4. Remove and retain six bolts (Figure 5, Item 6) that secure outer fan blade cover (Figure 5, Item 7). Remove fan blade cover (Figure 5, Item 7) and set aside.
5. Remove and retain six bolts (Figure 5, Item 5) that secure inner fan blade cover (Figure 5, Item 4). Remove fan blade cover (Figure 5, Item 4) and slide back over fan blades.
6. Remove fan blade from water pump pulley (WP 0053).
7. Place protective cover (i.e., cardboard, plywood, etc.) over radiator fins to avoid damage during lifting of EGA.
8. Disconnect engine drain line (Figure 5, Item 18) from Coolant Drain plug connection (Figure 5, Item 16) on Genset.

END OF TASK

Removing Exhaust Connection**WARNING**

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

If necessary, loosen thermal insulation (Figure 5, Item 13) around exhaust flex pipe (Figure 5, Item 12).

1. Loosen two nuts (Figure 5, Item 11) from clamp/U-bolt (Figure 5, Item 10) and slide exhaust flex pipe (Figure 5, Item 12) from exhaust pipe "T" (Figure 5, Item 9) on exhaust manifold (Figure 5, Item 8) (WP 0055).
2. Loosen two nuts (Figure 5, Item 15) from clamp/U-bolt (Figure 5, Item 14) and slide exhaust flex pipe (Figure 5, Item 12) from elbow going to muffler (0052).

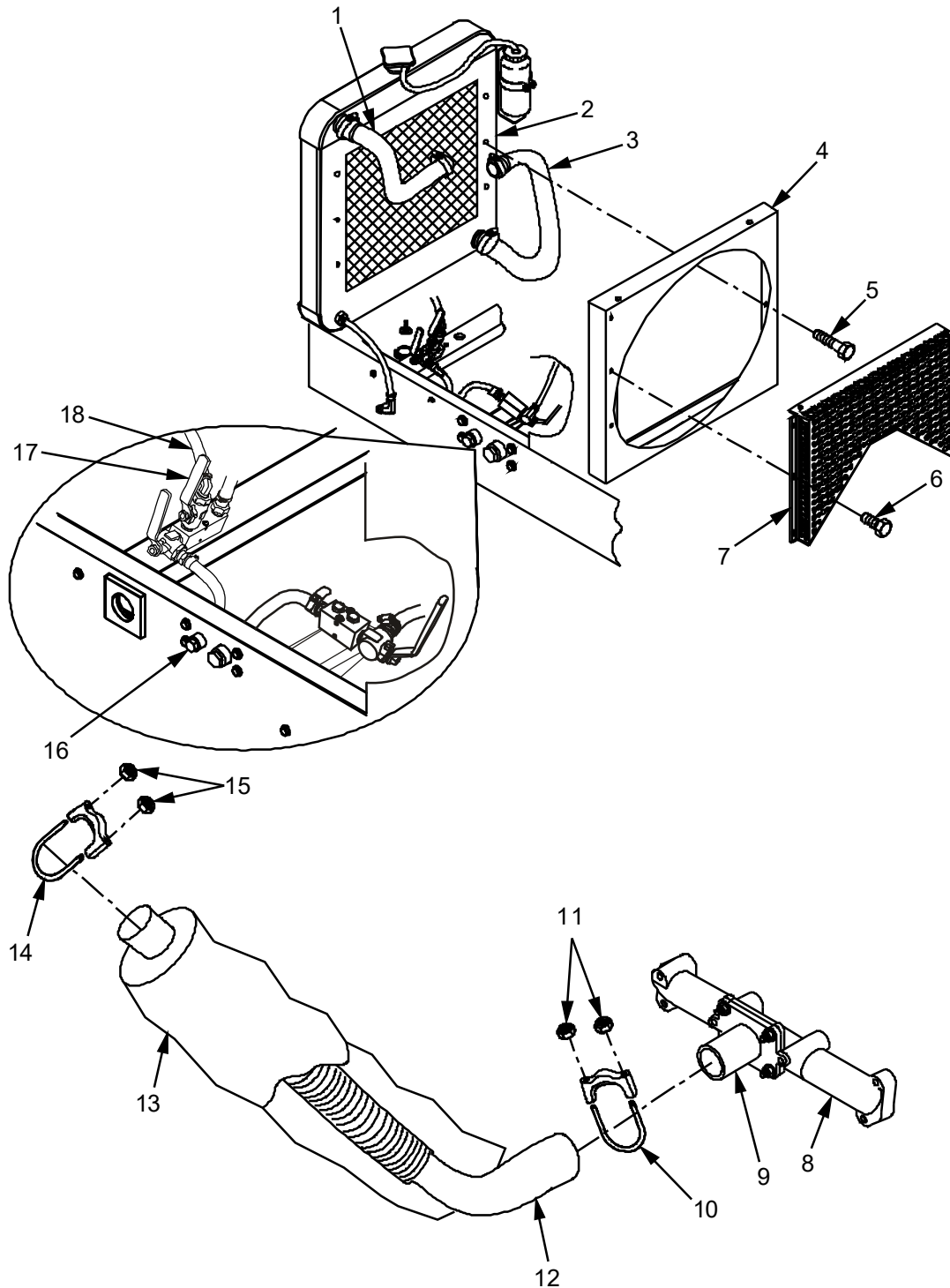


Figure 5. Radiator and Exhaust Manifold Connections - Replace.

END OF TASK

Removing Engine Block Heater and Battery Warmer Connections**WARNING**

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under hoses and lines being removed.

1. Loosen hose clamp on engine block heater fuel line (Figure 6, Item 8) at the engine block heater and disconnect fuel line. Place fuel line into spill bucket (WP 0055).
2. Disconnect power connection (Figure 6, Item 9) from engine block heater fuel pump (Figure 6, Item 7). Follow wiring and remove any strap ties/cable clamps securing wiring.
3. Remove and retain bolt (Figure 6, Item 4) and washers (Figure 6, Items 4 and 5) that secures engine block heater fuel pump (Figure 6, Item 7) to I-beam (Figure 6, Item 1).
4. Remove and retain bolt (Figure 6, Item 2) and washer (Figure 6, Item 3) that secures engine block heater exhaust line clamp (Figure 6, Item 5) to I-beam (Figure 6, Item 1).

END OF TASK**Removing Battery Warming Plate Connections****WARNING**

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

NOTE

Collect fluids in appropriate chemical-resistant containers. If disposing of fluids, dispose of properly through local servicing Defense Reutilization and Marketing Office.

Prior to performing the following steps, place absorbent towels under hoses and lines being removed.

1. Disconnect input and output hoses (Figure 6, Items 11) from battery warming plate (Figure 6, Item 12). Place input and output hoses (Figure 6, Items 11) into spill bucket (WP 0056).
2. Follow input and output hoses (Figure 6, Items 11) around engine and remove any strap ties/cable clamps securing hoses.

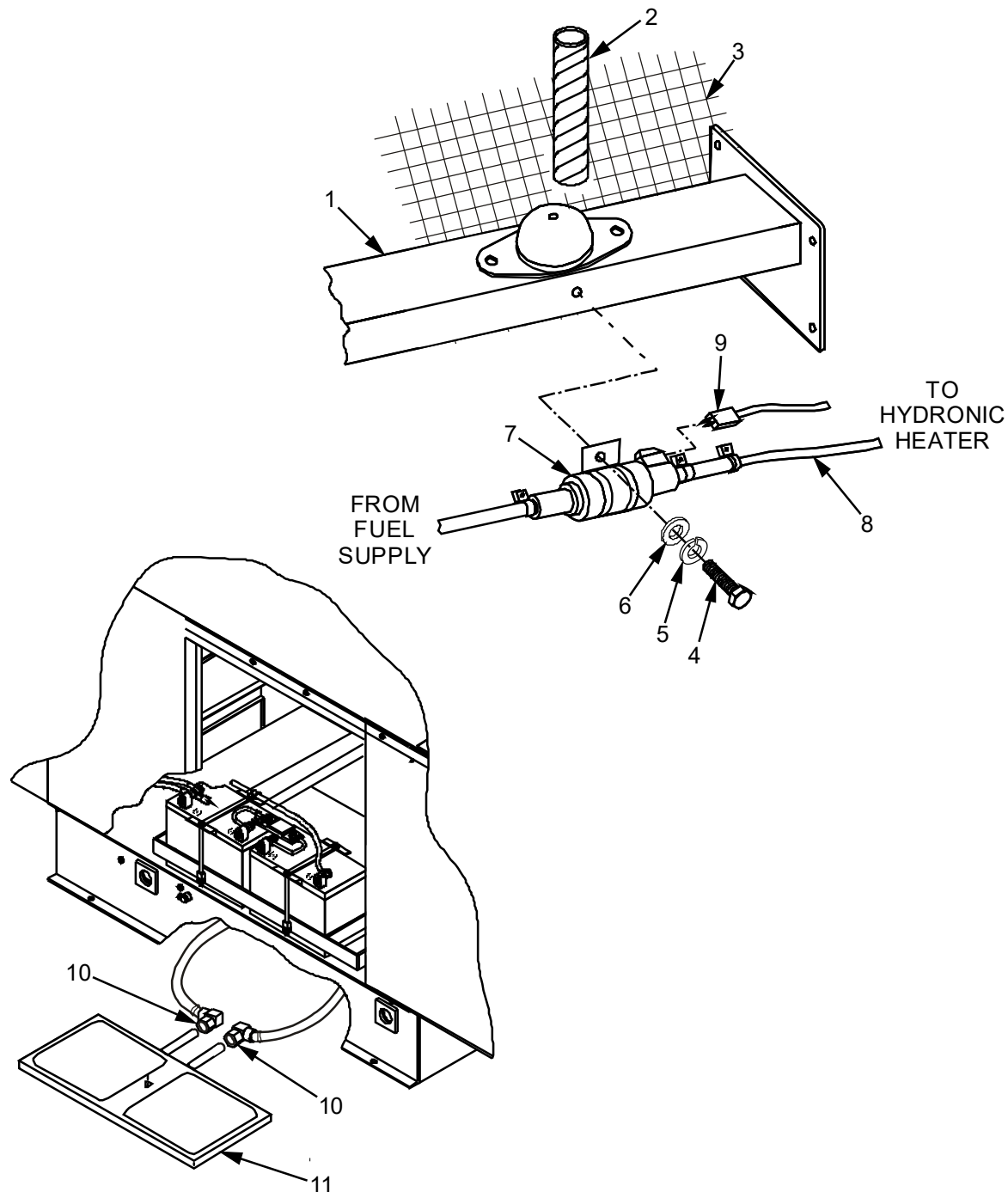


Figure 6. Engine Block Heater and Battery Warming Plate Connections - Replace.

END OF TASK

Removing Engine Generator Assembly (EGA)**WARNING**

The Engine Generator Assembly (EGA) weighs 680 lb (309.1 kg). The engine weighs 344 lb (156.36 kg) and the generator weighs 336 lb (152.72 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the EGA is removed, do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to EGA.

To avoid possibility of counter balance to the HP-2C/185 UST Trailer, ensure that tongue jack and jack assemblies are lowered to ground level to support trailer.

When performing the following step, ensure that chain/sling has two lift points. If all lift points are not utilized, EGA will be off balance causing EGA to tilt. Damage could occur to the HP-2C/185 UST Trailer EGA.

NOTE

One lift point (Figure 7, Item 7) is located on the engine and one lift point (Figure 7, Item 6) is located on the generator.

1. Attach chain/sling to two lift points (Figure 7, Items 6 and 7).
2. Remove and retain four mounting nuts (Figure 7, Item 1) and washers (Figure 7, Item 2) securing EGA (Figure 7, Item 3) to shock mounts (Figure 7, Item 4) on frame (Figure 7, Item 5).

NOTE

When performing the following step, ensure that area where EGA is to be placed is dry and level. Ensure that supports allow adequate room below EGA so that no items on bottom become damaged.

3. If setting EGA on dirt, sand or other unstable ground, place supports (i.e., treated lumber) along ground for EGA (Figure 7, Item 3) to be placed on once removed from trailer.
4. Inspect around EGA. Ensure ALL cables, hoses, clamps, and other connections have been removed and EGA is free and clear of any obstructions or interference.

Removing Engine Generator Assembly - Continued

CAUTION

When performing the following step, guides should be observant of EGA to ensure no pieces from EGA get caught while lifting is in process and to ensure supports are properly placed so that nothing on EGA gets damaged when placing onto supports. Be observant of radiator fins.

5. Using a suitable lifting device, raise EGA (Figure 7, Item 3) off of trailer and place on supports. Once EGA (Figure 7, Item 3) is safely lowered, remove chain/sling from lift points.

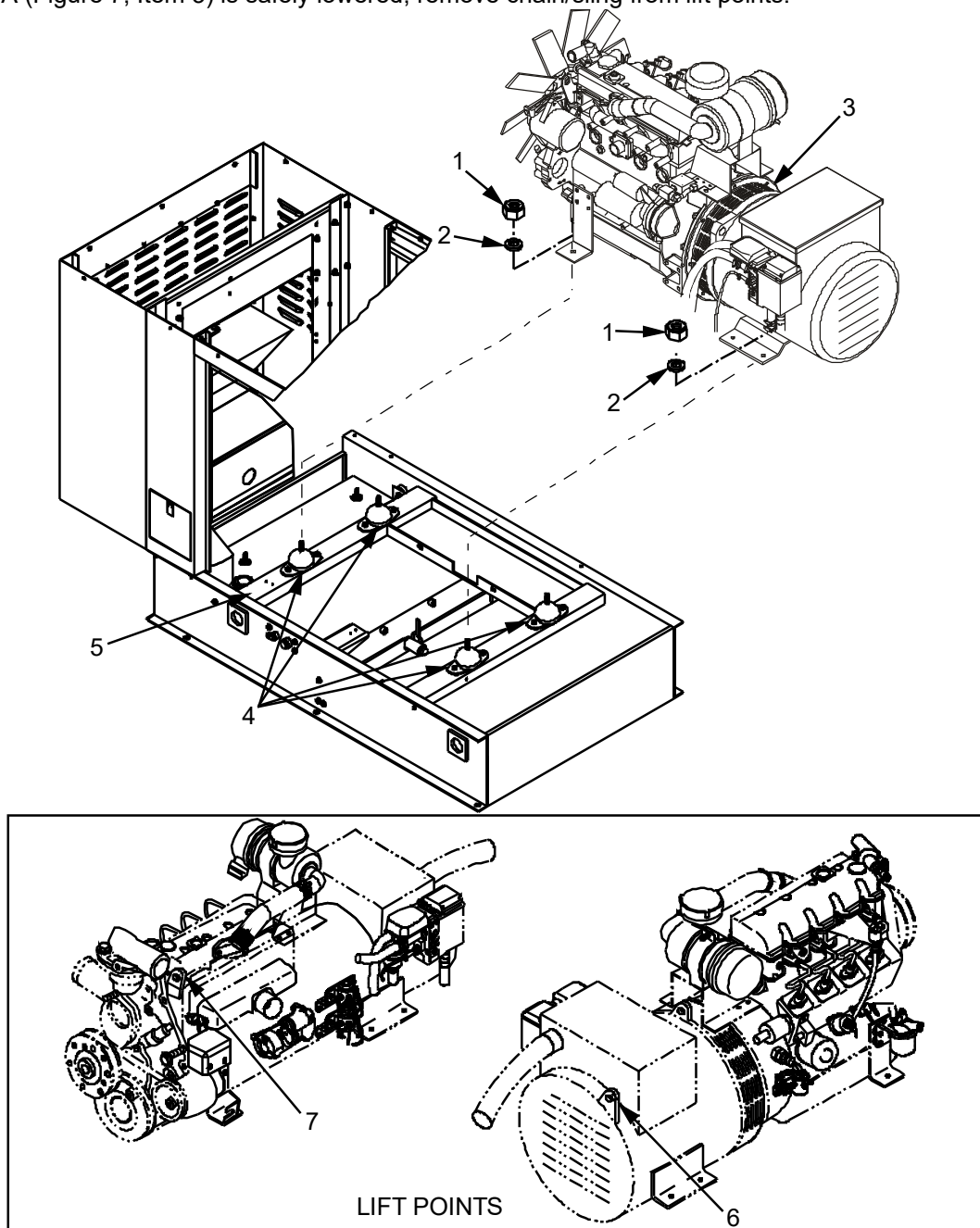


Figure 7. Engine Generator Assembly (EGA) - Replace.

END OF TASK

REPLACEMENT**Installing Engine Generator Assembly (EGA)****WARNING**

The Engine Generator Assembly (EGA) weighs 680 lbs (309.1 kg). The engine weighs 344 lbs (156.36 kg) and the generator weighs 336 lbs (152.72 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to performing any maintenance that requires climbing on or under trailer, ensure wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

Once the EGA is raised do not allow unit to hang from lifting device. Failure to observe this warning can result in serious injury or death to personnel or damage to EGA.

1. Prior to installing the EGA:
 - Inspect all hoses and belts and ensure they are in good working order (i.e., no dry-rot, cracks, fraying or other damage). If necessary, replace as described in the appropriate work package.
 - Inspect radiator and fuel tank. Ensure they are in good working order. If necessary, replace as described in the appropriate work package.
 - Inspect all shock mounts ensure they are in good working order (i.e., no dry-rot, cracks or other damage). If necessary, replace.
 - All electrical connections are in good working order (i.e., no fraying, loose connections, corrosion).
 - Ensure engine and generator are properly connected and all mounting hardware between engine and generator is secure.
2. Inspect inside of enclosure and area around EGA is free and clear of any obstructions or interference.
3. Attach chain/sling to the two lift points (Figure 7, Items 6 and 7).

CAUTION

When performing the following step, guides should be observant of EGA to ensure no pieces from EGA get caught while lifting is in process.

4. Using a suitable lifting device, raise EGA (Figure 7, Item 3) up over enclosure and begin lowering.
5. Guide EGA (Figure 7, Item 3) onto shock mounts (Figure 7, Item 4) and secure using four mounting nuts (Figure 7, Item 1) and washers (Figure 7, Item 2).
6. Using torque wrench, tighten four mounting nuts (Figure 7, Item 1) to 51 ft./lb (69.15 n-m/7.05 kgf-m).
7. Once EGA (Figure 7, Item 3) is secured, remove chain/sling from lift points.

END OF TASK**Connecting Radiator**

1. Install inner fan blade cover (Figure 5, Item 4) over water pump pulley.
2. Install fan blade onto water pump pulley. Refer to WP 0053 for procedure and torque requirements.
3. Slide inner fan blade cover (Figure 5, Item 4) over fan blades and secure to radiator using six bolts (Figure 5, Item 5).
4. Ensure that fan belt is proper tension. Refer to WP 0052 for procedure and torque requirements.
5. Install outer fan blade cover (Figure 5, Item 7) and secure using six bolts (Figure 5, Item 6).
6. Ensure overflow tube is secured to fan blade cover (Figure 5, Item 7) with strap ties.
7. Connect upper radiator hoses (Figure 5, Item 1) from radiator (Figure 5, Item 2) to water pump. Refer to procedure in WP 0054.
8. Connect lower radiator hose (Figure 5, Item 3) from engine to radiator (Figure 5, Item 2). Refer to procedure in WP 0050.
9. Connect engine drain line (Figure 5, Item 8) to Coolant Drain plug connection (Figure 5, Item 16) on Genset.

END OF TASK**Connecting Exhaust****NOTE**

If necessary, loosen thermal insulation (Figure 5, Item 13) around exhaust flex pipe (Figure 5, Item 12).

1. Install exhaust flex pipe (Figure 5, Item 12) onto elbow going to muffler. Secure using clamp/U-bolt (Figure 5, Item 14) and two nuts (Figure 5, Item 15).
2. Install exhaust flex pipe (Figure 5, Item 12) onto exhaust pipe "T" (Figure 5, Item 9) on exhaust manifold (Figure 5, Item 8). Secure using clamp/U-bolt (Figure 5, Item 10) and two nuts (Figure 5, Item 11).

END OF TASK**Connecting Engine Block Heater Connections**

1. Connect engine block heater fuel line (Figure 6, Item 9) to engine block heater and secure with hose clamp (WP 0066).
2. Secure engine block heater exhaust line (Figure 6, Item 4) to I-beam (Figure 6, Item 1) with clamp (Figure 6, Item 5), bolt (Figure 6, Item 2) and washer (Figure 6, Item 3).
3. Connect power connection (Figure 6, Item 10) to engine block heater fuel pump (Figure 6, Item 8). Follow wiring and secure with strap ties/cable clamps as required.

Connecting Engine (Engine block) Heater Connections – Continued

4. Secure engine block heater fuel pump (Figure 6, Item 8) to I-beam (Figure 6, Item 1) with bolt (Figure 6, Item 6) and washer (Figure 6, Item 7).

END OF TASK**Connecting Battery Warming Plate****NOTE**

Prior to connecting input and output hoses wrap threads with Tape, Antisiezing.

1. Connect input and output hoses (Figure 6, Items 11) to battery warming plate (Figure 6, Item 12) and tighten (WP 0056).
2. Follow input and output hoses (Figure 6, Items 11) around engine and secure with strap ties/cable clamps.

END OF TASK**Connecting Oil Line****NOTE**

Prior to connecting drain line wrap threads with Tape, Antisiezing.

1. Connect drain line (Figure 4, Item 1) to bottom of oil pan (Figure 4, Item 3) and tighten.
2. Ensure valve to LUBE OIL plug (Figure 4, Item 10) is closed.

END OF TASK**Connecting Fuel Lines**

1. If necessary, move fuel line heater below I-beam out of the way.
2. Connect the inlet fuel line (Figure 4, Item 4) running from fuel line heater (Figure 4, Item 9) to the fuel filter.
3. Connect the engine return fuel line (Figure 4, Item 2) to the fuel injector rail (WP 0077). Install any strap ties needed to secure engine return fuel line.

NOTE

Refer to Table 2 or Figure FO-10 for electrical schematic.

4. Pull back the protective cover (near K 4 solenoid) from fuel line heater (Figure 4, Item 9) and secure fuel heater electrical connections. Insulate connections with electrical tape.

Connecting Fuel Lines - Continued

Table 2. Fuel line Heater Connections.

Fuel Line Heater Connections	Connector Identifier
1	402-K4S-3
2	407-EBGL

NOTE

When specific torque requirements are NOT stated in the procedures, refer to WP 0175 for torque requirements.

5. Secure fuel line (Figure 4, Item 8) to engine with bracket (Figure 4, Item 5), using two mounting bolts (Figure 4, Item 7) and two flat washers (Figure 4, Item 6).

END OF TASK**Electrical Connections**

1. Connect ground cable to GROUND on frame of Genset.
2. Connect ground cable (black) (Figure 3, Item 12) to engine block with mounting bolt (Figure 3, Item 16).
3. Route ground cable (black) (Figure 3, Item 12) around engine and place near negative (–) battery terminal. Secure ground cable (black) (Figure 3, Item 12) with any cable clamps removed during disassembly (WP 0056).
4. Ensure engine block heater (Figure 3, Item 14) and engine block heater exhaust line (Figure 3, Item 15) are securely fastened.
5. Verify that cable box (Figure 3, Item 21) has been installed onto generator and secured using four bolts (Figure 3, Item 22).
6. Insert conduit (Figure 3, Item 1) from generator through barrier panel wall (Figure 3, Item 25) and secure using jam nut (Figure 3, Item 24).
7. Feed harness through barrier panel wall and connect CM1 to CF1 (on barrier panel side). If necessary, refer to FO-10 for electrical schematic.
8. Remove and retain four nuts (Figure 3, Item 3) and new lock washers (Figure 3, Item 4) from terminals of generator.

NOTE

If necessary, refer to Table 3 or Figure FO-10 for electrical schematic.

9. Connect four wires (Figure 3, Item 2) (red, white, blue, and black) to generator and secure using four nuts (Figure 3, Item 3) and new lock washers (Figure 3, Item 4).
10. Remove and retain screw (Figure 3, Item 5) from generator. Connect ground wire (green) (Figure 3, Item 6) and secure using screw (Figure 3, Item 5).
11. Feed all five wires (Figure 3, Item 2) (red, white, blue, black and green) through conduit (Figure 3, Item 1) to barrier panel side.

Electrical Connections - Continued

12. Connect three wires (Figure 3, Item 2) (red, blue, and black) to input side of circuit breaker CB5 on barrier panel.
13. Connect white wire to neutral terminal block (PTB2) on barrier panel.
14. Connect green wire to ground terminal block (GB) on barrier panel.
15. Replace instrument panel and circuit breaker panel as a whole unit as described in WP 0077 Steps 1 – 8.

Table 3. Generator to Barrier Panel Connections.

Wire Color	Generator Connections	Barrier Panel Connections
Black	T7	171-CB7-1
Red	T8	172-CB7-3
Blue	T9	173-CB7-5
White	T4,T5,T6	177-PTB2-15
Green	GGL (Generator junction box)	178-GB-2

16. Install generator cable access cover (Figure 3, Item 7) and secure using four bolts (Figure 3, Item 8).

WARNING

DO NOT connect cables to battery terminals until instructed to do so. Premature connections will create a complete circuit and cause an unsafe working condition.

17. Connect battery cable (red) (Figure 3, Item 10) to starter (Figure 3, Item 17) and secure onto bolt (Figure 3, Item 20) using nut (Figure 3, Item 18) and washer (Figure 3, Item 19).
18. Route starter cable (red) (Figure 3, Item 10) around engine and place near positive battery terminal. Secure starter cable (red) (Figure 3, Item 10) with any cable clamps removed during disassembly.
19. Route engine block heater cable (red) (Figure 3, Item 11) around engine and place near positive battery terminal. Secure engine block heater cable (red) (Figure 3, Item 11) with any cable clamps removed during disassembly.
20. Route J6 cable (red) (Figure 3, Item 9) around engine and place near positive battery terminal. Secure J6 cable (red) (Figure 3, Item 9) with any cable clamps removed during disassembly.
21. Reconnect all battery cables to battery as described in WP 0056.
22. Connect fuse (Figure 3, Item 13) to battery terminals (WP 0056).

END OF TASK

Fluids**NOTE**

Prior to performing the following steps:

- Ensure all fluid valves are closed.
- Inspect all hoses for cracks, swelling, or other obvious deterioration.
- Inspect all clamps verify that no damage or other obvious deterioration is present.

1. Fill fuel tank as described in WP 0005.

NOTE

Refer to WP 0180 (Expendable and Durable Items) for NSN and other information on oil and coolant.

2. Add 8.6 quarts (8.13 liters) of oil to engine as described in WP 0045.
3. Add proper coolant/water mix as necessary to bring the engine/radiator to proper level as described in WP 0069.
4. After all fluids have been added and are at their proper levels, inspect EGA for fluid leaks.

END OF TASK**Preparation for Operation**

1. Install radiator access panel (Figure 2, Item 8) onto Genset (Figure 2, Item 7) secure using 16 bolts (Figure 2, Item 11), new lock washers (Figure 2, Item 10), and flat washers (Figure 2, Item 9).
2. Install top access panel (Figure 2, Item 4) onto Genset (Figure 2, Item 7) and secure using 20 bolts (Figure 2, Item 12), new lock washers (Figure 2, Item 13), and flat washers (Figure 2, Item 14).
3. Install exhaust pipe cap (Figure 2, Item 1) and tighten nut (Figure 2, Item 3) and bolt (Figure 2, Item 2).
4. Perform all necessary PMCS (Refer to WP 0020 and WP 0052) on engine.
5. Install access doors (Figure 2, Items 5 and 6) onto Genset (Figure 2, Item 7).
6. Prime engine as described in WP 0077 and start Genset in accordance with WP 0005, Genset Start Procedure .
7. Install cargo restraints (not shown).

END OF TASK

SEPARATION OF ENGINE FROM GENERATOR ASSEMBLY

INITIAL SETUP:**Tools and Special Tools**

Standard automotive tool set (WP 0132, Table 2, Item 5)
Lifting device (Hoist/Tow truck/Crane)
Chains/straps

Materials/Parts

Cloth, cleaning (WP 0180, Table 1, Item 12)
Gloves, Rubber (WP 0180, Table 1, Item 17)
Strap, tie down (WP 0180, Table 1, Items 42 to 44)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0070, WP 0066,
FO-1 through FO-10

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

The Engine Generator Assembly (EGA) weighs 680 lb (309.1 kg). The engine weighs 344 lb (156.36 kg) and the generator weighs 336 lb (152.72 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Once the generator assembly is removed, do not allow unit to hang from lifting device or tilt forward main stator may slide out of position. Failure to observe this warning can result in serious injury or death to personnel or damage to internal parts of the generator.

REMOVAL

1. Remove EGA as described in this WP.
2. Remove any strap ties/cable clamps securing engine (engine block) heater hoses and wiring harnesses around engine (engine block) heater.
3. Remove engine (engine block) heater (Figure 8, Item 21) from generator (Figure 8, Item 19) (WP 0066).
4. Remove and retain bolt (Figure 8, Item 3), three flat washers (Figure 8, Items 4 and 6), lock washer (Figure 8, Item 5) and nut (Figure 8, Item 7) securing metal grille (Figure 8, Item 8). Discard lock washers (Figure 8, Item 5).
5. Remove any strap ties/cable clamps securing hoses and wiring harnesses around metal grille of generator.
6. Remove and retain metal grille (Figure 8, Item 8).
7. Remove and retain eight bolts (Figure 8, Item 16) and lock washers (Figure 8, Item 15) from flex plate (Figure 8, Item 11). Discard lock washers (Figure 8, Item 15).
8. Attach chain/sling to the two lift points (Figure 3, Items 20 and 22) on the engine. Remove any slack from chain/sling and support engine.

REMOVAL - Continued

9. Remove and retain six mounting bolts (Figure 8, Item 14) and lock washers (Figure 8, Item 13) securing the generator to the engine (Figure 8, Item 1).
10. Remove two nuts (Figure 8, Item 17) securing the generator to the two alignment studs (Figure 8, Item 18).

CAUTION

When performing the following step, ensure that flex plate (Figure 8, Item 11) on generator and engine flywheel do not stick together causing main stator to slide out of generator. Failure to observe this caution can result in serious damage to the generator.

Prior to beginning the following steps, ensure that engine and generator are supported separately using a bottle jack (Figure 8, Item 9) or lumber support (Figure 8, Items 2 and 10). Failure to observe this caution can result in serious damage to engine or generator.

11. Pry generator away from the engine.

WARNING

The generator weighs 336 lb (152.72 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

CAUTION

When performing the following step, ensure that generator does NOT lean forward; the main stator may slide out of position. Failure to observe this caution can result in serious damage to the generator.

12. Using a suitable lifting device, slightly raise generator and slide away from the engine. Ensure generator is tilted back slightly to keep stator from falling out.
13. Using, strap ties, secure flex plate to frame of generator.

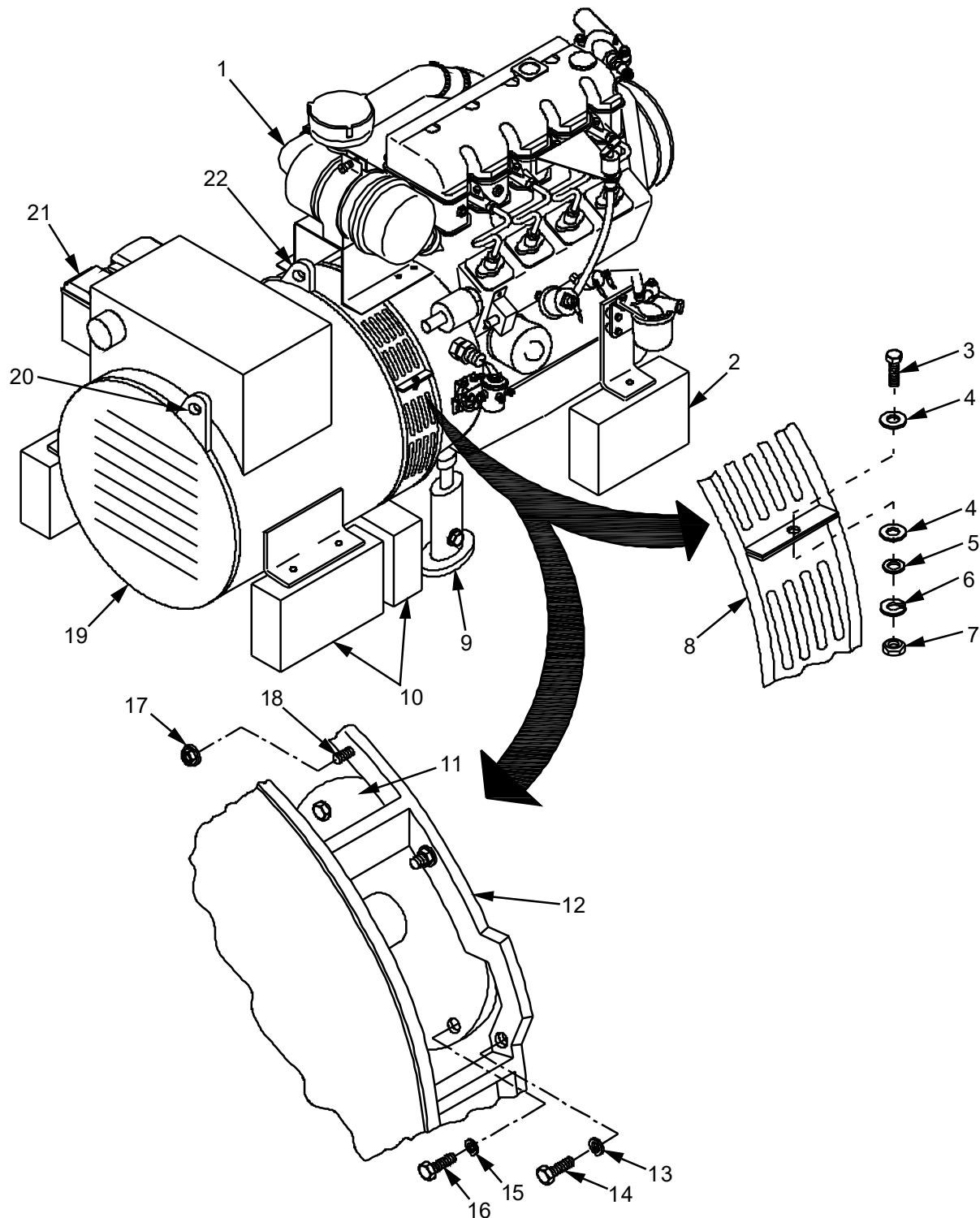


Figure 8. Separating Engine from Generator Assembly.

END OF TASK

REPLACEMENT**WARNING**

The generator weighs 336 lbs (152.72 kg). Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the engine or generator without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

CAUTION

Prior to beginning the following steps, ensure that engine and generator are supported separately using a bottle jack (Figure 8, Item 9) or lumber support (Figure 8, Items 2 and 10). Failure to observe this caution can result in serious damage to the engine or generator.

1. Attach suitable lifting device to the two lift points (Figure 8, Items 20 and 22) on the generator (Figure 8, Item 19). Remove any slack from chain/sling.
2. Remove any strap ties securing flex plate (Figure 8, Item 11) to frame of generator.

CAUTION

When performing the following step, ensure that generator does NOT lean forward; the main stator may slide out of position. Failure to observe this caution can result in serious damage to the generator.

3. Using a suitable lifting device, lift generator (Figure 8, Item 19) and guide onto two alignment studs (Figure 8, Item 18) on engine (Figure 8, Item 1). Ensure generator is tilted back slightly to keep stator from falling out.
4. Loosely install two nuts (Figure 8, Item 17) onto two alignment studs (Figure 3, Item 18) on engine.
5. Loosely install six mounting bolts (Figure 8, Item 14), new lock washers (Figure 8, Item 13), and secure generator (Figure 8, Item 19) to engine (Figure 8, Item 1).
6. Align flex plate (Figure 8, Item 11) with engine (Figure 8, Item 1). Loosely install eight bolts (Figure 8, Item 16) and new lock washers (Figure 8, Item 15).
7. Using torque wrench, tighten two nuts (Figure 8, Item 17) on alignment studs (Figure 8, Item 18) to 35 to 40 ft./lb (47.45~54.23 n-m/4.84~5.53 kgf-m).
8. Using torque wrench, tighten six mounting bolts (Figure 8, Item 14) and lock washers (Figure 8, Item 13) to 35 to 40 ft./lb (47.45~54.23 n-m/4.84~5.53 kgf-m).
9. Using torque wrench, tighten eight bolts (Figure 8, Item 16) and lock washers (Figure 8, Item 15) on flex plate (Figure 8, Item 11) to 17 to 20 ft./lb (23.05~27.11 n-m/2.35~2.76 kgf-m).
10. Install metal grille (Figure 8, Item 8) onto generator and secure with bolt (Figure 8, Item 3), flat washer (Figure 8, Item 4 and 6), new lock washer (Figure 8, Item 5), and nut (Figure 8, Item 7). Using torque wrench, tighten bolts (Figure 8, Item 3) to 7 to 10 ft./lb (9.49~13.55 n-m/0.97~1.38 kgf-m).

REPLACEMENT - Continued

11. Install engine (engine block) heater (Figure 8, Item 21) to generator (WP 0066).
12. Secure engine (engine block) heater hoses and wiring harnesses using strap ties and/or cable clamps.
13. Install EGA as described in this WP.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
BARRIER PANEL FUSE REPLACEMENT

GENERAL

This work package provides information on the service and removal/replacement of sub-assemblies for the Genset. They consist of:

- Fuse removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the Genset.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluid and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

In event of a venting, clear area until pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

FUSE TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:**Materials/Parts**

Fuse

References

WP 0005

Personnel Required

One

Equipment ConditionGenset shut down

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

TEST

1. Set BATTERY switch to ON.
2. Set engine START switch to RUN.
3. Open control panel (Figure 1, Item 3) and observe LEDs (Figure 1, Item 2). If LED is on, fuse is bad, replace.

END OF TASK**REMOVAL**

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Open control panel (Figure 1, Item 3).
3. Remove retainer (Figure 1, Item 4) from inside of control panel cavity.
4. Open cover (Figure 1, Item 6) and remove fuse (Figure 1, Item 5).

END OF TASK**REPLACEMENT**

1. Install new fuse (Figure 1, Item 5) and snap cover (Figure 1, Item 6) into place.
2. Insert retainer (Figure 1, Item 4) into empty slot in control panel cavity.
3. Close control panel (Figure 1, Item 3) and secure.
4. Start Genset as outlined in Genset Start Procedure (WP 0005) of this TM.

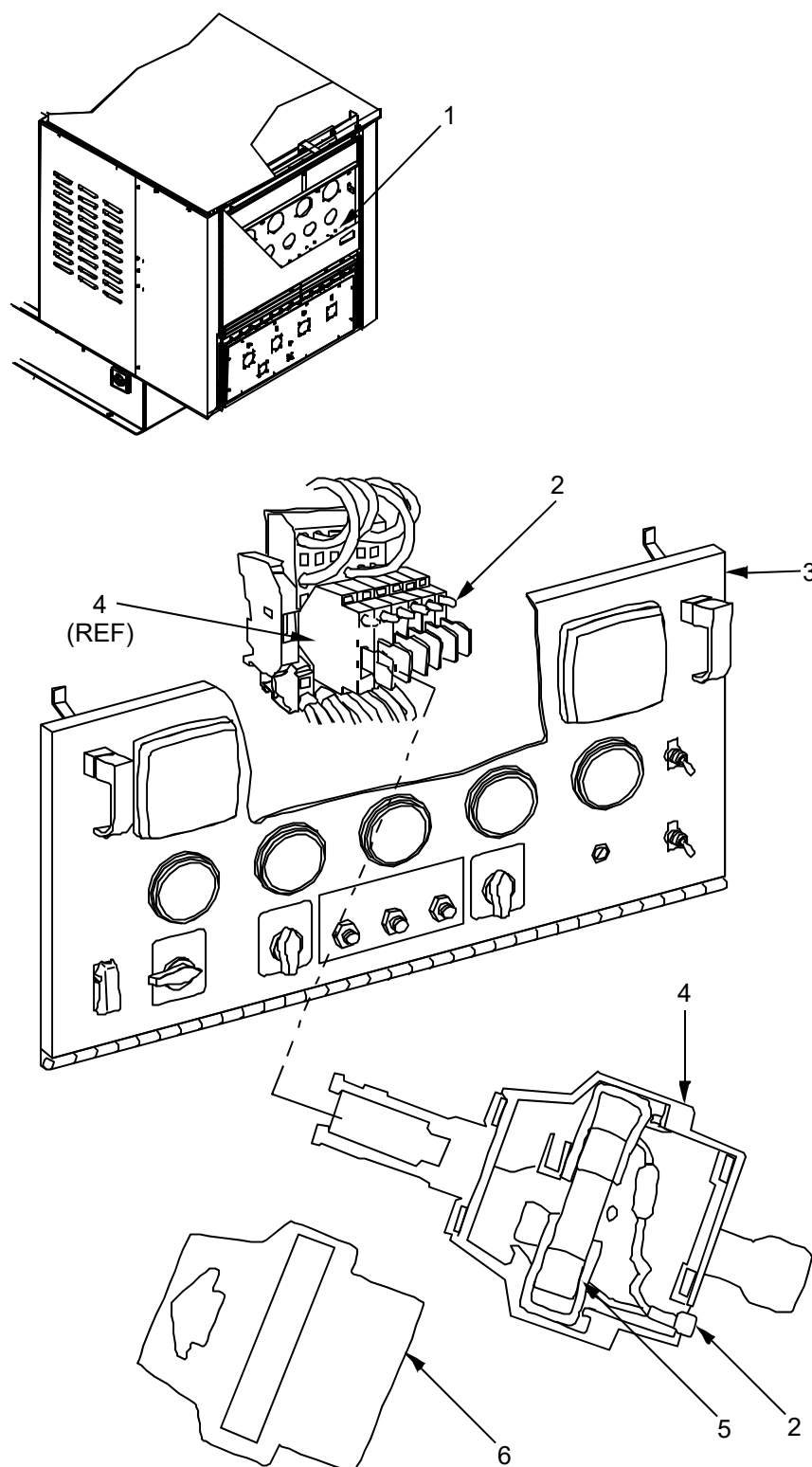


Figure 1. Fuse Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET WIRING HARNESS AND CONNECTORS MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the replacement of components on the Genset barrier panel. Consisting of:

- Genset Wiring Harness and Connectors

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are set and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

If Genset is tied into a power grid, high voltage and amperage from other Gensets/sources may be present at electrical connections within the local Genset. Ensure that all interconnect switches and circuit breakers have been de-energized prior to performing any procedures. Failure to observe this warning can result in serious injury or death.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Wear appropriate eye protection when performing maintenance. Metal pieces, fluids, dirt, grease, corrosion, and escaping vapors and gasses present. Failure to comply may result in injury to personnel.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

CAUTION

Never attempt to connect or disconnect cables while Genset is in operation. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal when conducting any procedures on the Genset.

GENSET – GENSET WIRING HARNESS - REPAIR

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Reference

WP 0005

Materials/Parts

Electrical connectors

Electrical tape

Strap, Tie Down (WP 0180, Table 1, Items 42, 43, & 44)

Protector, Electrical Cable

(WP 0180, Table 1, Items 32, 33, & 34)

Engine Wiring Harness

MOS 91D (1)

Equipment Condition

Genset shut down

BATTERY SWITCH – OFF

Personnel Required

Power Generation Equipment Mechanic,

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REPAIR

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Remove cargo restraints (not shown) to gain access to Genset (Figure 1, Item 1). Remove front access panel (Figure 1, Item 2), rear access panel (Figure 1, Item 3), and set aside.

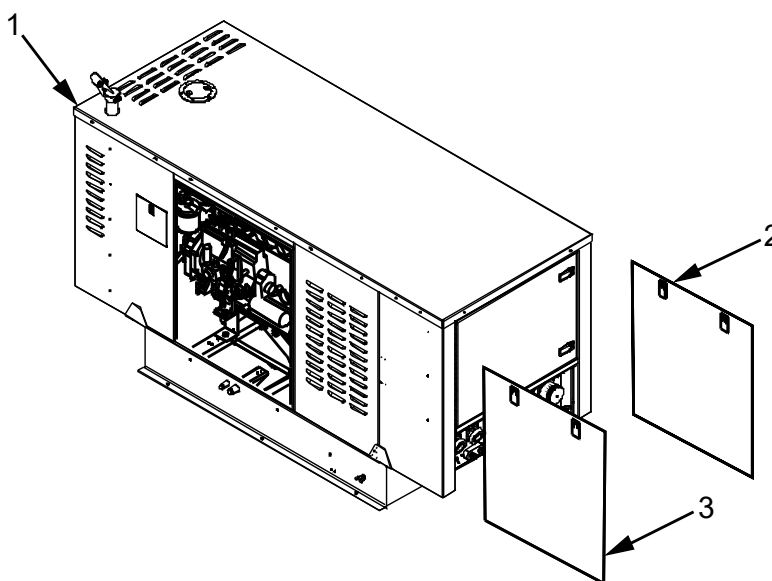


Figure 1. Remove Access Panels.

GENERAL REPAIR INSTRUCTIONS

1. Refer to Figure 2 and Table 1 for a listing of the types of electrical connectors and wire terminals to be repaired
2. Cut tie wraps that are in the way of accessing electrical connectors, terminals, and wiring harnesses. Discard tie wraps.

NOTE

Ring, tongue, and spade terminals are identically repaired.

3. Remove terminal from wire by cutting directly behind edge of shrink tubing. Discard terminal.
4. Slide new shrink tubing onto wire.
5. Use wire strippers to strip approximately 0.25 in. (6,3 mm) of wire.
6. Crimp new terminal onto wire using crimp tool.
7. Solder wire core on terminal per J-STD-001 with soldering iron.
8. Slide shrink tubing over terminal at wire connection.
9. Secure shrink tubing onto terminal with a heat gun.
10. Repair electrical wiring harnesses by running a replacement wire "piggyback" along existing wiring harness.

NOTE

The following is an example of how to replace a damaged wire by piggybacking a replacement wire alongside wire(s) to be repaired. Treat each end as a separate repair. You may replace a connector on one end and splice on the opposite end.

1. After determining a wire is damaged inside a wiring harness, repair using one of the following methods:
2. Cut defective wire about 3.0 in. (76,2 mm) from connector on both ends of wiring harness.
3. Remove pins from connectors at each end of affected wire and replace with new wire and pins.
4. Using a replacement wire of same gauge, install wire along harness cover on wiring harness, fastening wire to harness cover with tie wraps at 3.0 in.(76,2 mm) intervals.

NOTE

Allow at least 1.0 in. (25,4 mm) of slack in replacement wire for splicing.

5. Use wire strippers to strip approximately 0.25 in. (6,3 mm) from ends of defective wire.
6. Install shrink tubing over defective wire and slide away from ends of wire to allow splicing.
7. Splice and solder wires together per J-STD-001 with soldering iron and splice clips.
8. Cover soldered joint with shrink tubing and secure with heat gun.
9. Repair any rips or tears in wiring harness cover with electrical tape.
10. Replace any tie wraps that have been removed from wiring harness during repair process as needed.

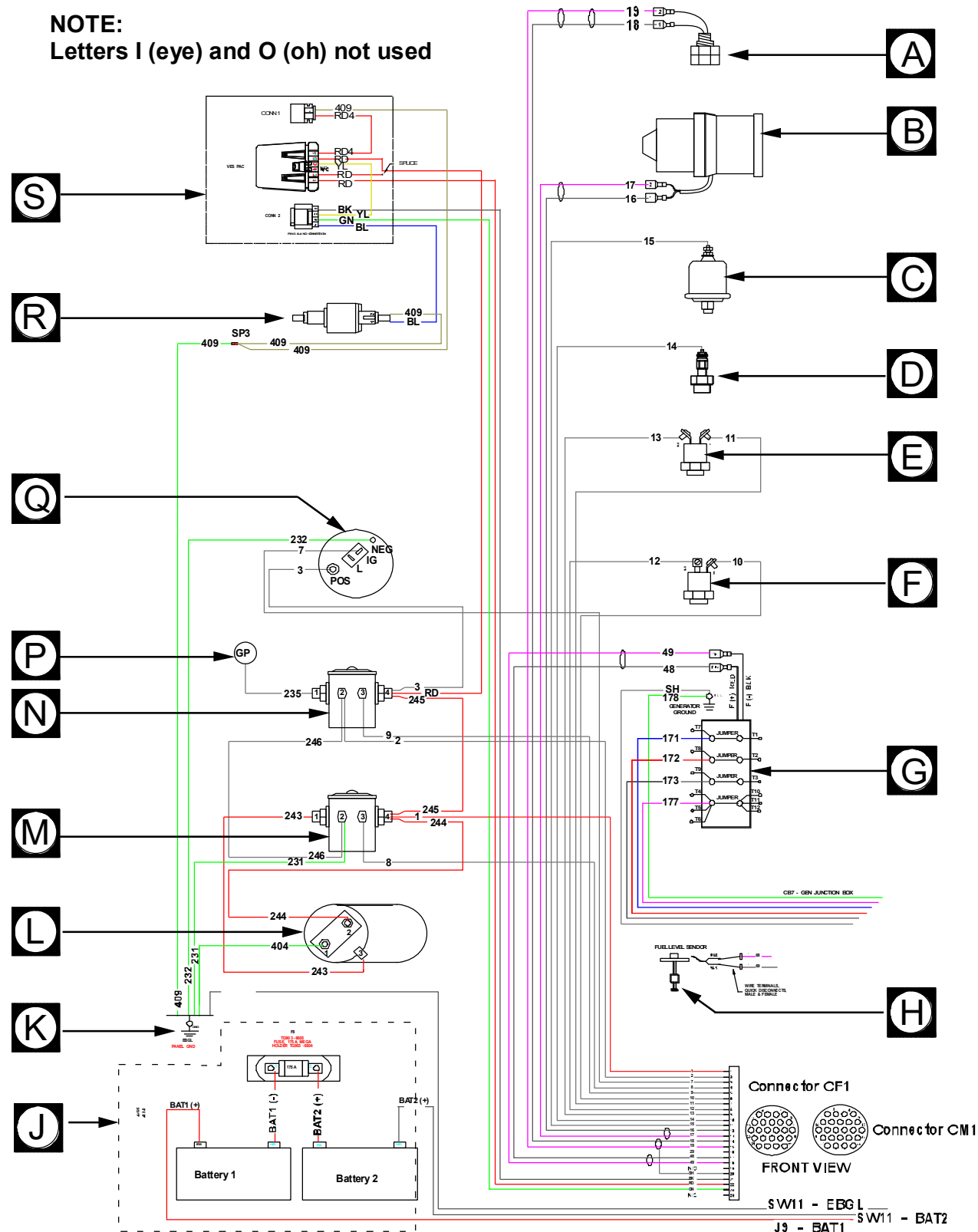


Figure 2. Engine Wire Harness Connections.

Table 1. Engine Wire Harness Connection Details.

Item #	Engine Device (Schematic Reference)	Device Connections	Wire Number	Wire Gauge	Wire Color	Connector Type
A	Magnetic Speed Sensor (MP)	1 2	18 19	#18/2, shielded	Grey Grey	Terminal Ring, 16-14, #8-10 stud
B	Variable Speed Actuator (ACT)	1 2	16 17	#16 #16	Grey Grey	Female, 16-14 Female, 16-14
C	Oil Pressure Sender (OPS)	1	15	#16	Grey	Terminal Ring, 16-14, #8-10 stud
D	Coolant Temp Sensor (CTS)	1	14	#16	Grey	Terminal Ring, 16-14, #8-10 stud
E	Low Oil Press shutdown switch (LOPS)	1 2	11 13	#16	Grey	Terminal Ring, 16-14, #8-10 stud
F	High Temp shutdown Switch (HTS)	1 2	10 12	#16	Grey	Terminal Ring, 16-14, #8-10 stud
G	Generator	1 F(+) 2 F(-) 3 GCL 4 T7 5 T8 6 T9 7 T4 8 T5 9 T6	48 49 SH and 178 171 172 173 177 - -			
H	Fuel Tank Sensor (FUEL)	1 RED 2 BLK	68 69			
J	BATTERY ASSY					
K	GROUND					
L	Starter (STR)	1 2 3	NA 404 & 244 243			
M	K2S Relay	1 2 3 4	243 246 & 231 8 1 & 244 & 245	#14	Grey	Terminal Ring, 12-10, 3/8" stud. Terminal Ring, 16-14, #8-10 stud
N	K3S Relay	1 2 3 4	235 2 & 246 9 2 & RD & 245	#14	Grey	Terminal Ring, 16-14, #8-10 stud. Terminal Ring, 16-14, #8-10 stud.
P	Glow Plugs	1	235	#14		
Q	Alternator	1 (IG) 2 (NEG) 3 (POS)	7 232 3		Grey	Terminal Ring, 12-10, 3/8" stud. Connector, T, 2-position, female.
r	Engine Block Heater Fuel Pump (WEB)	1 2	BL 409			
s	Engine Block Heater					

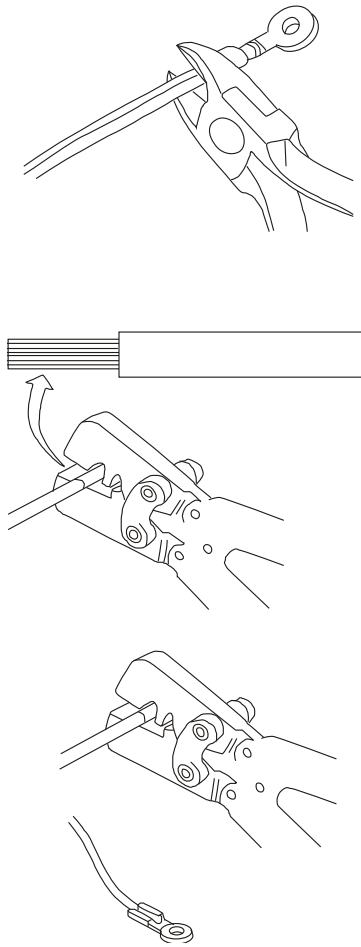


Figure 3. Cut Off Old Connector and Crimp On New Connector.

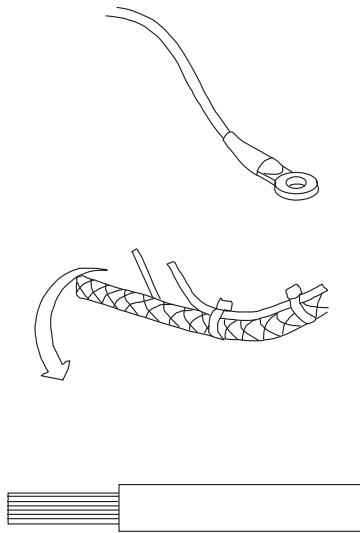


Figure 4. Attach and Secure Loose Wire to Harness.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET CONTROL PANEL – SWITCHES AND POTENTIOMETER

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- VOLTAGE ADJUST potentiometer
- BATTLE SHORT toggle switch
- ENGINE HEATER toggle switch
- FUEL LINE HEATER toggle switch
- VOLT/AMP rotary switch
- PANEL LIGHT rotary switch
- ENGINE rotary switch
- Panel lights
- HIGH COOLANT TEMP light
- OVERSPEED light
- LOW OIL PRESSURE light
- BATTERY SWITCH
- EMERGENCY STOP

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the ANALOG Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-13) for electrical schematics and wiring diagrams.

VOLTAGE ADJUST POTENTIOMETER TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Multimeter (WP 0132, Item 2)
Safety glasses

Materials/Parts

Potentiometer
Desoldering wick (WP 0180, Item 15)
Heat shrink (WP 0180, Items 31 to 34)
Strap ties (WP 0180, Item 55 to 57)
Alcohol, Isopropyl (WP 0180, Item 1)
Solder, electrical (WP 0180, Item 53)
Brush, acid (WP 0180, Item 9))

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

TEST

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Verify that wiper (center post) is shorted to the Max terminal (shorted to wiper) .
3. Disconnect wiring from potentiometer.
4. Set multimeter to reads resistance (1K Ω).
5. Place meter leads on wiper and Min terminal (NOT shorted to wiper) of potentiometer.
6. Adjust potentiometer:
 - a. If meter deflects smoothly and measure 1K Ω at maximum, potentiometer is good.
 - b. If meter deflects erratically, suddenly drops to 0 Ω , or does not measure 1K Ω at maximum, potentiometer is bad, replace

END OF TASK

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel (Figure 1, Item 1), allow control panel (Figure 1, Item 1) to drop down and hang from lanyards. Remove any strap-ties securing associated wiring to control panel (Figure 1, Item 1).
4. Mark and disconnect terminals from leads (Figure 1, Item 3) hanging off of potentiometer (Figure 1, Item 2).
5. Remove and retain nut (Figure 1, Item 4) that secures potentiometer (Figure 1, Item 2) to control panel (Figure 1, Item 1).
6. Remove potentiometer (Figure 1, Item 2) from control panel (Figure 1, Item 1).
7. Desolder leads (Figure 1, Item 3) from potentiometer (Figure 1, Item 2). Disconnect leads (Figure 1, Item 3) and set aside.

END OF TASK**REPLACEMENT****NOTE**

If wires/terminals to be soldered to potentiometer are not usable, fabricate new leads using (16 AWG) wire and appropriate terminal.

If necessary, tin joints on potentiometer and clean with alcohol in preparation to receive solder.

1. Strip, tin and prep leads (Figure 1, Item 3) for soldering.
2. Place heat shrink over prepared leads (Figure 1, Item 3). Form J-hook with tinned wire.
3. Solder leads (Figure 1, Item 3) to terminals on potentiometer (Figure 1, Item 2) (see Figure 1) and allow to cool.
4. Remove excess flux with acid brush and isopropyl alcohol and inspect joints.
5. Slide heat shrink over soldered joints and apply heat using heat gun.
6. Insert potentiometer (Figure 1, Item 2) into control panel (Figure 1, Item 1) (terminals towards edge of control panel) and secure using nut (Figure 1, Item 4). Secure wiring to control panel (Figure 1, Item 1) using strap-ties.
7. Close control panel (Figure 1, Item 1) and secure.
8. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

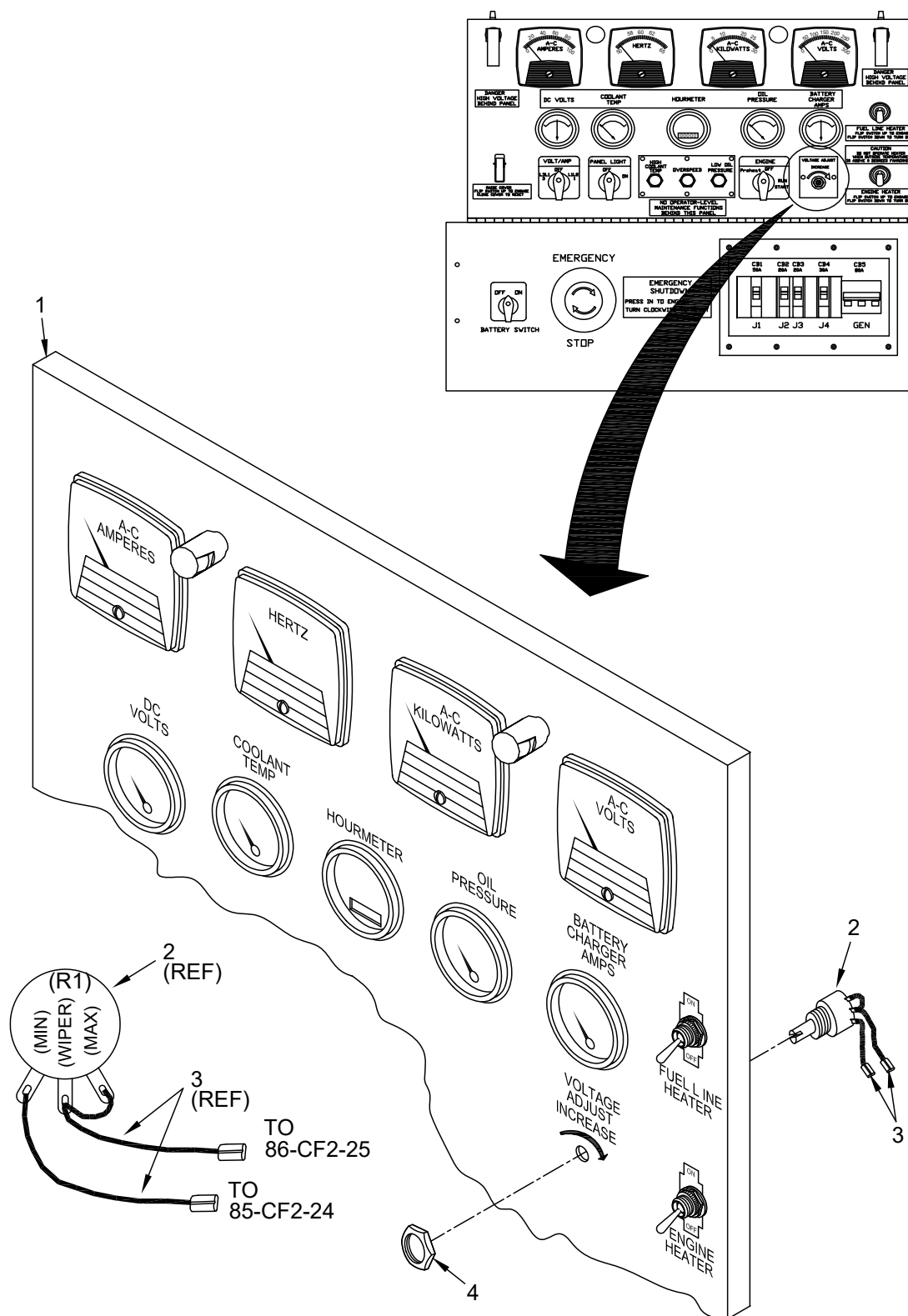


Figure 1. Potentiometer Removal/Replacement.

END OF TASK

ROTARY SWITCHES REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Multimeter (WP 0132, Item 2)
Safety glasses

Materials/Parts

Switch(s)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure covers the following assemblies:

- VOLT/AMP rotary switch
- PANEL LIGHT rotary switch
- ENGINE rotary switch

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY rotary switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel (Figure 2, Item 1), allow control panel (Figure 2, Item 1) to drop down and hang from lanyards. Remove any strap-ties securing associated wiring harness to control panel (Figure 2, Item 1).
4. Remove and retain screw (Figure 2, Item 7) and knob (Figure 2, Item 6) from rotary switch being replaced.
5. Carefully pry off silver cover (Figure 2, Item 5) exposing mounting plate (Figure 2, Item 3) and four screws (Figure 2, Item 4) that secure rotary switch (Figure 2, Item 2) to control panel (Figure 2, Item 1).
6. Remove and retain four mounting screws (Figure 2, Item 4) that secure mounting plate (Figure 2, Item 3) and rotary switch (Figure 2, Item 2) to control panel (Figure 2, Item 1).
7. Remove and retain mounting plate (Figure 2, Item 3) from control panel (Figure 2, Item 1).

REMOVAL - Continued**NOTE**

Be observant of jumpers on rotary switches. Ensure they do not fall out when hardware is loosened.

8. Remove rotary switch (Figure 2, Item 2) being observant of orientation and positioning on control panel. (Figure 2, Item 2).
9. Loosen but do not remove hardware securing terminal leads to rotary switch (Figure 2, Item 2). Remove wiring from rotary switch (Figure 2, Item 2) and re-tighten hardware.

END OF TASK**REPLACEMENT****NOTE**

If necessary, refer to (Table 1) or (FO-6 through FO-13) for electrical schematics and wiring diagrams.

Be observant of jumpers on rotary switches. Ensure they are in the proper locations on the switch.

1. Loosen but do not remove hardware securing terminal leads to rotary switch (Figure 2, Item 2). Install terminals from wiring harness to appropriate terminals on rotary switch (Figure 2, Item 2) and re-tighten hardware.
2. Insert rotary switch (Figure 2, Item 2) being observant of orientation and positioning through rear of control panel (Figure 2, Item 1).
3. Place mounting plate (Figure 2, Item 3) on front of control panel (Figure 2, Item 1) and loosely install four mounting screws (Figure 2, Item 4). Once hardware is aligned, tighten four mounting screws (Figure 2, Item 4)
4. Install silver cover (Figure 2, Item 5) onto mounting plate (Figure 2, Item 3).
5. Install knob (Figure 2, Item 6) onto rotary switch (Figure 2, Item 2) and secure with screw (Figure 2, Item 7).
6. Close control panel (Figure 1, Item 1) and secure.
7. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Genset Control Panel - Rotary Switch Connections.

SWITCH ID	SCHEMATIC ID	SWITCH TERMINAL	HARNESS ID	JUMPERS
VOLT/AMP	SW1	1	71-CF2-17	
		2	no connection	
		3	75-M2	
		4		Jumper to pin #8
		5	73-CF2-19	
		6	84-M4	
		7	72-CF2-18	
		8	83-M4	Jumper to pin #4
		9	no connection	
		10	no connection	
		11		Jumper to pin #19
		12		Jumper to pin #16
		13	79-M1	Jumper to pin #17
		14	67-CF2-14	
		15	no connection	
		16	69-CF2-16	Jumper to pin #12
		17		Jumper to pin #13
		18	no connection	
		19	78-M1	Jumper to pin #11
		20	68-CF2-15	
PANEL LIGHT	SW2 (PLS)	1	23-SW3-11	
			38-M9	
		2	24-L1, L2	
		3	no connection	
ENGINE	SW3 (ESS)	4	no connection	
		1	1-CF2-2	
		2	20-CF2-7	
		3		Jumper to pin #7
		4	8-CF2-2	
		5	no connection	
		6	30-R2-1	
			31-MS-1	
		7		Jumper to pins #3 and #11
		8	10-CF2-4	
		9		
		10	25-L3-L5	
		11		Jumper to pin #7
		12	9-CG2-3	

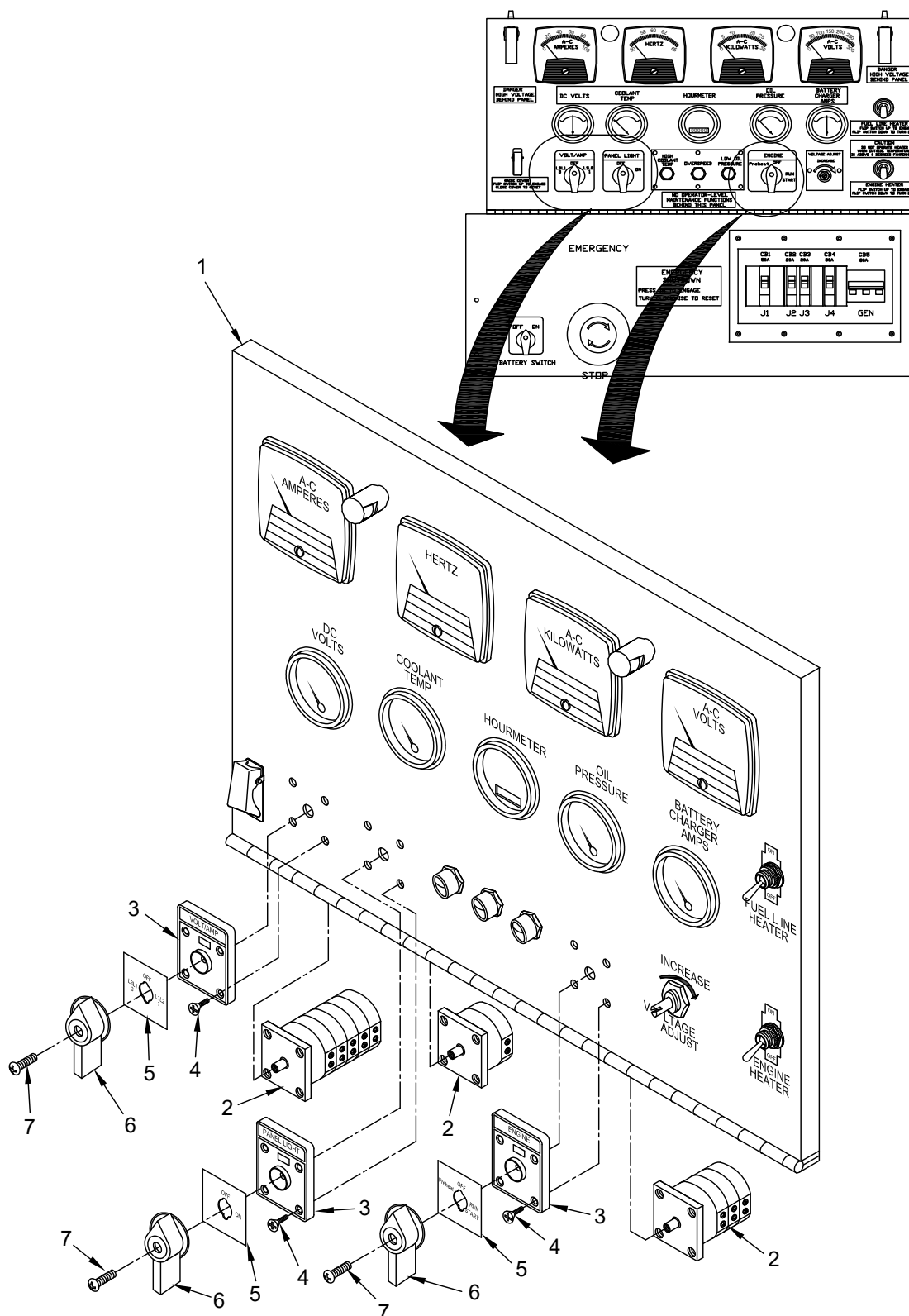


Figure 2. Rotary Switch Removal/Replacement.

END OF TASK

TOGGLE SWITCHES REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Safety glasses

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

Materials/Parts

Switch(s)

References

WP 0005, WP 0056,
FO-6 through FO-13

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

FUEL LINE HEATER/ ENGINE HEATER**REMOVAL**

1. Verify that Genset has been shut down, engine is cool and that BATTERY rotary switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel (Figure 3, Item 1), allow control panel (Figure 3, Item 1) to drop down and hang from lanyards. Remove any strap-ties securing associated wiring harness to control panel (Figure 3, Item 1).
4. Mark and disconnect all wires from toggle switch (Figure 3, Item 2) being observant of terminal association.
5. Remove and retain nut (Figure 3, Item 5) and plate (Figure 3, Item 4) from toggle switch (Figure 3, Item 2) being replaced.
6. Remove toggle switch (Figure 3, Item 2) from control panel (Figure 3, Item 1).

END OF TASK

REPLACEMENT**NOTE**

Ensure nut (Figure 3, Item 3) is present on switch (Figure 3, Item 2). If necessary, adjust to allow sufficient threads to protrude through control panel.

1. Install toggle switch (Figure 3, Item 2) into control panel (Figure 3, Item 1) being observant of orientation.
2. Install plate (Figure 3, Item 4) and secure to control panel (Figure 3, Item 1) with nut (Figure 3, Item 5).

NOTE

If necessary, refer to (Table 2) or (FO-6 through FO-13) for electrical schematics and wiring diagrams.

3. Connect all wires to toggle switch (Figure 3, Item 2).
4. Close control panel (Figure 1, Item 1) and secure.
5. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK**BATTLE SHORT****REMOVAL**

1. Verify that Genset has been shut down, engine is cool and that BATTERY rotary switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel (Figure 3, Item 1), allow control panel (Figure 3, Item 1) to drop down and hang from lanyards. Remove any strap-ties securing associated wiring harness to control panel (Figure 3, Item 1).
4. Mark and disconnect all wires from toggle switch (Figure 3, Item 9) being observant of terminal association.
5. Remove and retain nut (Figure 3, Item 8), lock washer (Figure 3, Item 7), and guard (Figure 3, Item 6).
6. Remove toggle switch (Figure 3, Item 9) from control panel (Figure 3, Item 1).

END OF TASK

REPLACEMENT**NOTE**

Ensure nut (Figure 3, Item 3) is present on switch (Figure 3, Item 9). If necessary, adjust to allow sufficient threads to protrude through control panel.

1. Install toggle switch (Figure 3, Item 9) into control panel (Figure 3, Item 1) being observant of orientation.
2. Install guard (Figure 3, Item 6) and secure to control panel (Figure 3, Item 1) with lock washer (Figure 3, Item 7) and nut (Figure 3, Item 8)

NOTE

If necessary, refer to (Table 2) or (FO-6 through FO-13) for electrical schematics and wiring diagrams.

Once BATTLE SHORT switch is installed, multimeter should read short (0Ω) when BATTLE SHORT switch is in the up position

3. Connect all wires to toggle switch (Figure 3, Item 9).
4. Close control panel (Figure 3, Item 1) and secure.
5. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 2. Genset Control Panel - Toggle Switch Connections.

SWITCH ID	SCHEMATIC ID	SWITCH TERMINAL	HARNESS ID
BATTLE SHORT	SW5	1	29B-CF2-31
		2	1B-CF2-30
ENGINE HEAT	SW6	1	425-SW8-1
		2	424-SW8-2
		3	BK-CF2-33
		4	GN-CF2-35
FUEL LINE HEAT	SW8	1	425-SW6-1
			50B-M8-G
		2	424-SW6-2
			RD-CF-34
		3	50-CF-36
		4	425-SW8-3-4

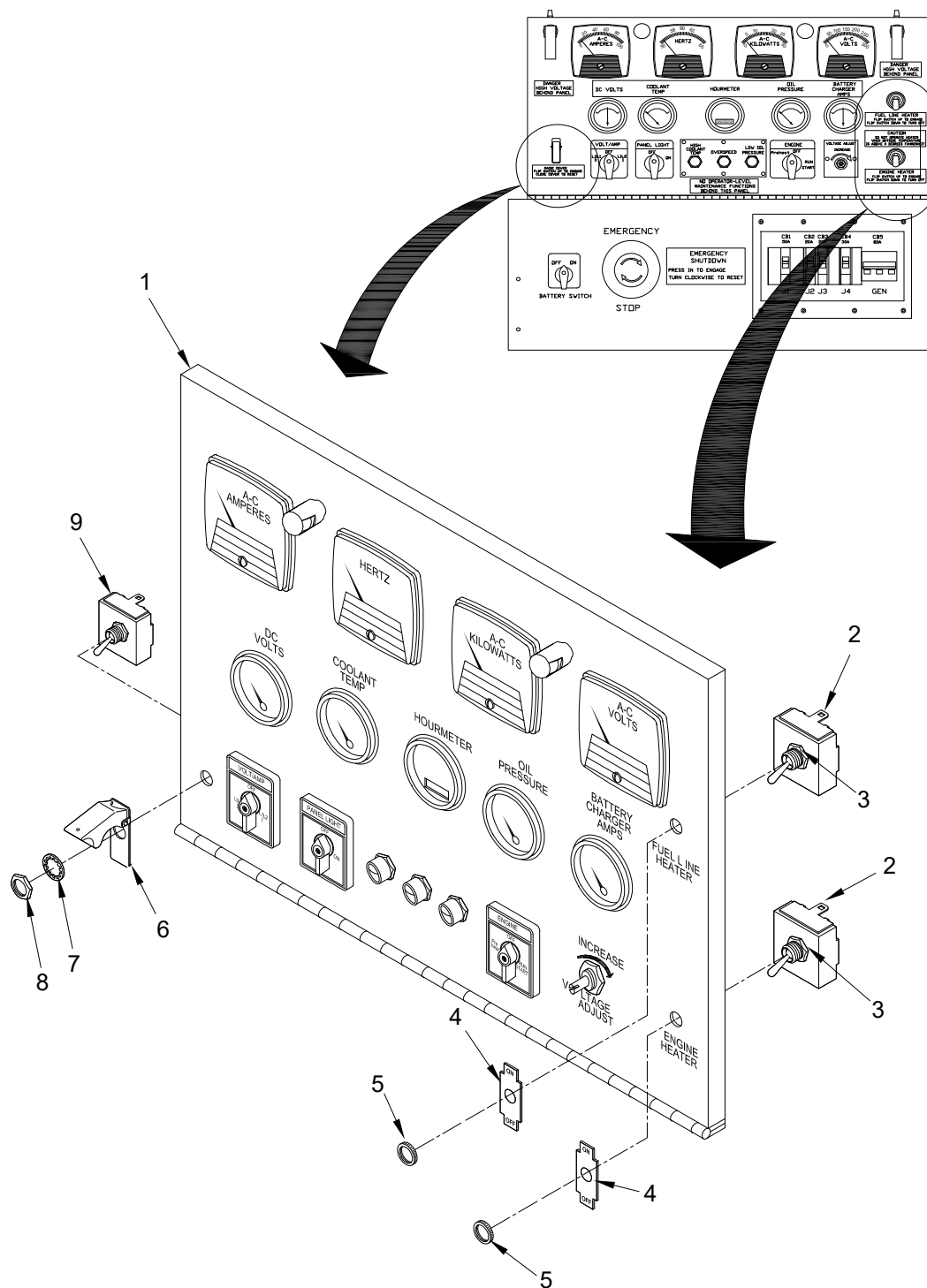


Figure 3. Toggle Switch Removal/Replacement.

END OF TASK

PANEL LIGHTS REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Materials/Parts

Panel light

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**References**WP 0005, WP 0056,
FO-6 through FO-13**Equipment Condition**Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel (Figure 4, Item 1). Allow control panel (Figure 4, Item 1) to drop down and hang from lanyards.
4. Mark and disconnect terminal coming from panel light (Figure 4, Item 12) from wiring harness.
5. Remove and retain nut (Figure 4, Item 3) and lock washer (Figure 4, Item 2) that secures panel light (Figure 4, Item 12) to control panel (Figure 4, Item 1).
6. Remove panel light (Figure 4, Item 12) from control panel (Figure 4, Item 1).

END OF TASK**REPLACEMENT****NOTE**

If necessary, remove cover (Figure 4, Item 10) and bulb (Figure 4, Item 11) from old panel light and install onto new panel light.

1. Insert panel light (Figure 4, Item 12) through front of control panel (Figure 4, Item 1).
2. Secure using nut (Figure 4, Item 3) and lock washer (Figure 4, Item 2).
3. Connect terminal from panel light (Figure 4, Item 12) to wiring harness.
4. Close control panel (Figure 4, Item 1) and secure.

REPLACEMENT - Continued

5. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

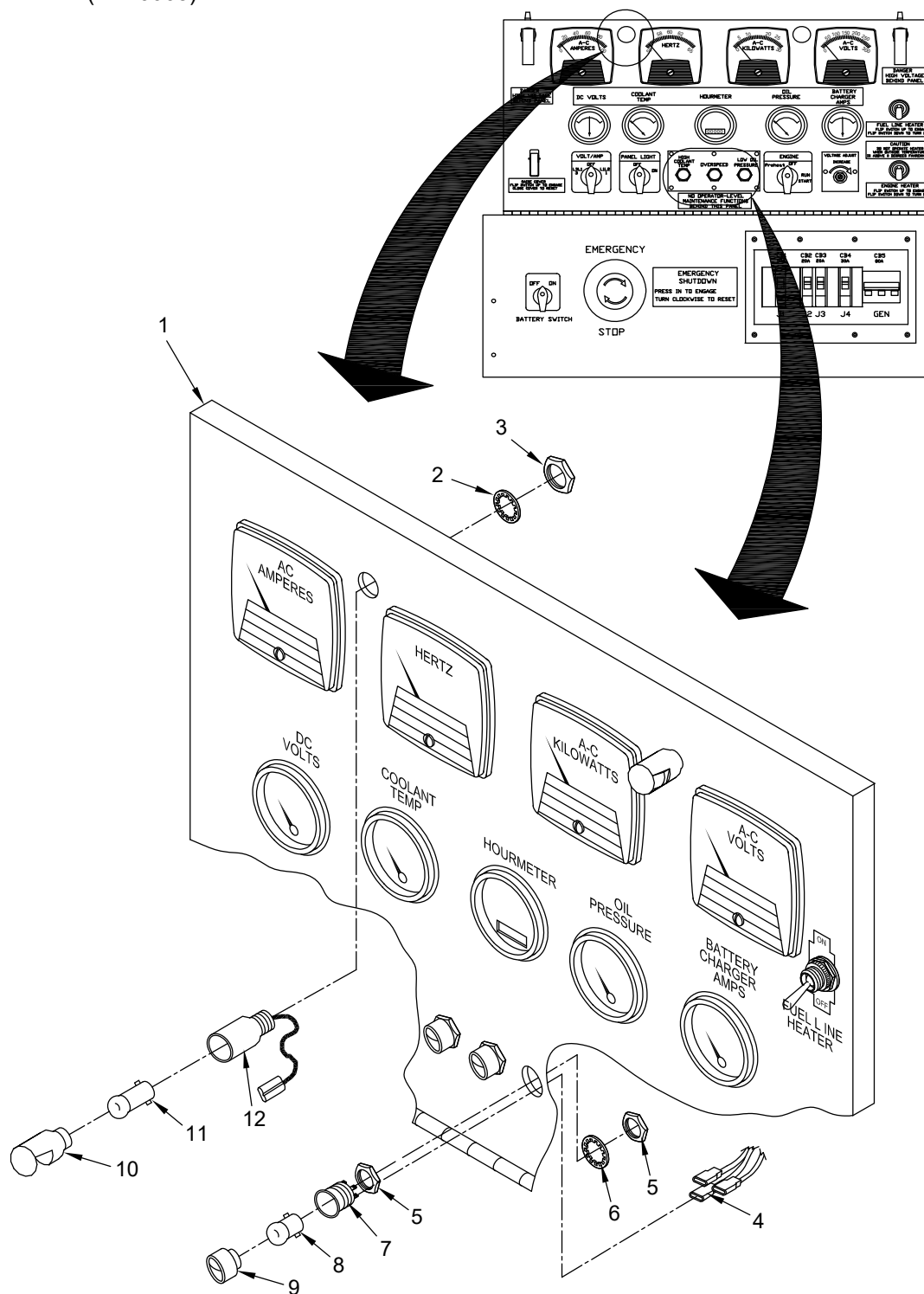


Figure 4. Light Assemblies Removal/Replacement.

END OF TASK

INDICATOR LIGHTS REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Materials/Parts

Indicator light)

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**References**WP 0005, WP 0056,
FO-6 through FO-13**Equipment Condition**Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure covers the following assemblies:

- HIGH COOLANT TEMP light
- OVERSPEED light
- LOW OIL PRESSURE light

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel (Figure 4, Item 1). Allow control panel (Figure 4, Item 1) to drop down and hang from lanyards.
4. Mark and disconnect three terminals (Figure 4, Item 4) coming from wiring harness from indicator light (Figure 4, Item 7).
5. Remove and retain nut (Figure 4, Item 5) and lock washer (Figure 4, Item 6) that secures indicator light (Figure 4, Item 7) to control panel (Figure 4, Item 1).
6. Remove indicator light (Figure 4, Item 7) from control panel (Figure 4, Item 1).

END OF TASK

REPLACEMENT**NOTE**

If necessary, remove cover (Figure 4, Item 9) and bulb (Figure 4, Item 8) from old indicator light (Figure 4, Item 7) and install onto new indicator light (Figure 4, Item 7).

1. Insert indicator light (Figure 4, Item 7) through front of control panel (Figure 4, Item 1).
2. Secure using nut (Figure 4, Item 5) and lock washer (Figure 4, Item 6).

NOTE

If necessary, refer to (Table 3) or (FO-6 through FO-13) for electrical schematics and wiring diagrams.

3. Connect three terminals (Figure 4, Item 4) from wiring harness indicator light (Figure 4, Item 7).
4. Close control panel (Figure 4, Item 1) and secure.
5. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 3. Indicator Light(s) Connections.

INDICATOR LIGHT ID	SCHEMATIC ID	TERMINAL CONNECTIONS		
		1	2	3
HIGH COOLANT TEMP	L 3	45-M6-G	34-CF2-9	25-SW3-9
LOW OIL PRESSURE	L 4	46-M8-G	35-CF2-10	25-SW3-9
OVERSPEED	L 5	47-M8-G	36-CF2-11	25-SW3-9

END OF TASK

BATTERY SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Materials/Parts

Battery Switch

Personnel RequiredPower Generation Equipment
Mechanic, MOS 91D (1)**References**

WP 0005, WP 0056

Equipment ConditionGenset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

BATTERY SWITCH**REMOVAL**

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Remove and retain eight screws (Figure 5, Item 14), lock washers (Figure 5, Item 13), and flat washers (Figure 5, Item 12) from circuit breaker cover plate (Figure 5, Item 11). Remove and retain circuit breaker cover plate (Figure 5, Item 11) from control panel (Figure 5, Item 1).
4. Remove and retain two countersunk screws (Figure 5, Item 17) from control panel (Figure 5, Item 1).
5. Remove and retain four screws (Figure 5, Item 22), lock washers (Figure 5, Item 23), and flat washers (Figure 5, Item 24) that secure control panel (Figure 5, Item 1) to Genset.
6. Raise control panel (Figure 5, Item 1) to gain access to electrical connections on switch (Figure 5, Item 2). Remove and retain two nuts (Figure 5, Item 4) and lock washers (Figure 5, Item 3) that secure electrical connections (Figure 5, Item 5) to switch (Figure 5, Item 2).
7. Mark and remove wiring harness terminals (Figure 5, Item 5) from switch (Figure 5, Item 2).
8. Remove and retain screw (Figure 5, Item 18) and knob (Figure 5, Item 19) from switch (Figure 5, Item 2).
9. Remove and retain nut (Figure 5, Item 20) and lock washer (Figure 5, Item 21). Remove switch (Figure 5, Item 3) from control panel (Figure 5, Item 1).

END OF TASK

REPLACEMENT

1. Insert switch (Figure 5, Item 2) through control panel (Figure 5, Item 1) and secure using lock washer (Figure 5, Item 21) and nut (Figure 5, Item 20).
2. Place knob (Figure 5, Item 19) onto switch (Figure 5, Item 2) and secure with screw (Figure 5, Item 18).
3. Connect wiring harness terminals (Figure 5, Item 5) to switch (Figure 5, Item 2) and secure using two nuts (Figure 5, Item 4) and lock washers (Figure 5, Item 3).
4. Align two countersunk screws (Figure 5, Item 15) with clips (Figure 5, Item 10) and secure control panel (Figure 5, Item 1) to barrier panel.
5. Install circuit breaker cover plate (Figure 5, Item 11) and secure to control panel (Figure 5, Item 1) using eight screws (Figure 5, Item 14), lock washers (Figure 5, Item 13), and flat washers (Figure 5, Item 12).
6. Secure control panel (Figure 5, Item 1) to Genset using four screws (Figure 5, Item 22), lock washers (Figure 5, Item 23), and flat washers (Figure 5, Item 24).
7. Connect negative terminal to battery (see WP 0056). Start Genset (Figure 5, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

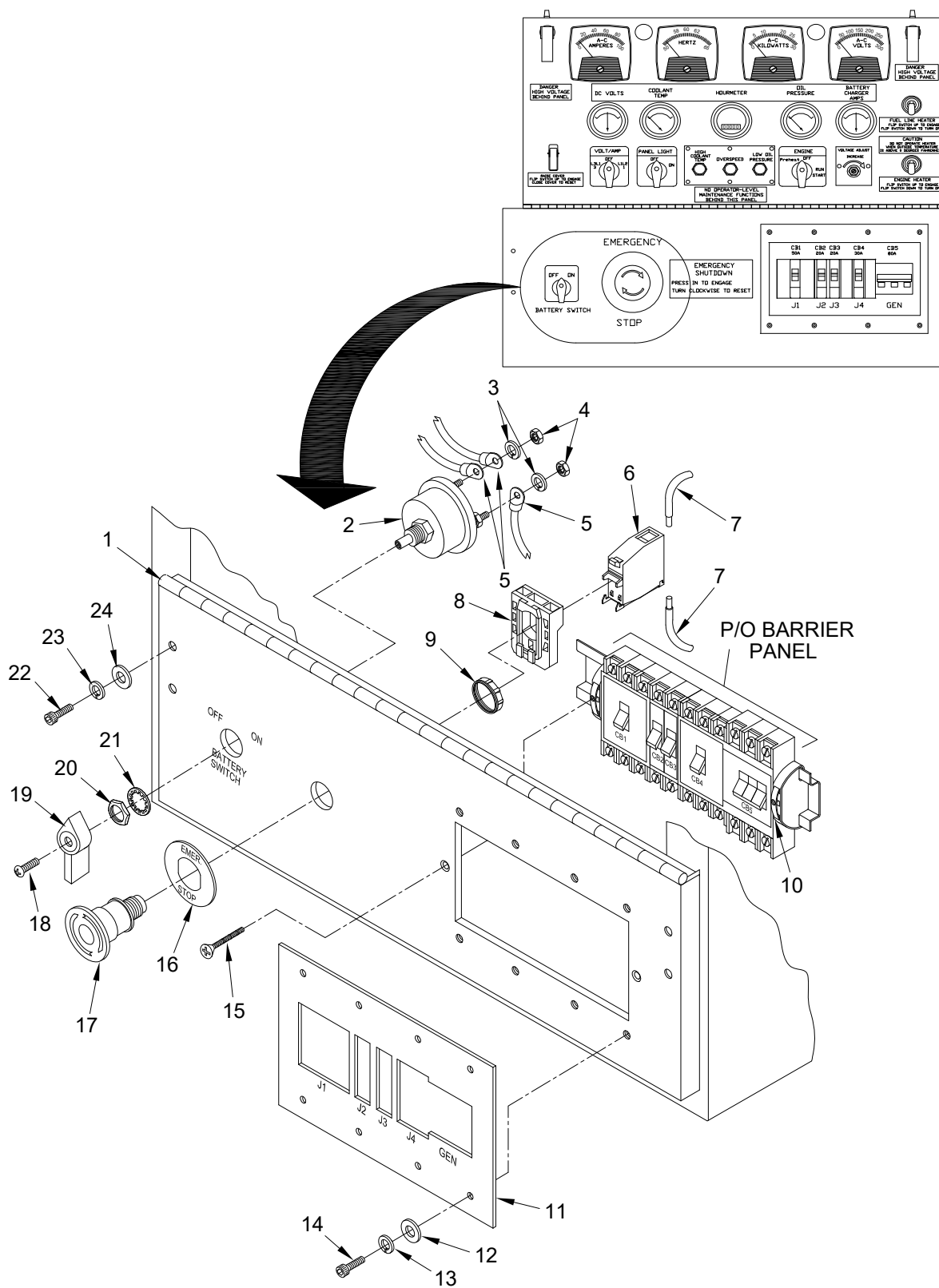


Figure 5. Battery Switch Removal/Replacement.

END OF TASK

EMERGENCY STOP SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Materials/Parts

Emergency Stop Switch

Personnel Required

Power Generation Equipment

Mechanic, MOS 91D (1)

References

WP 0005, WP 0056

Equipment Condition

Genset shut down

BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

EMERGENCY STOP**REMOVAL**

1. Verify that Genset has been shut down, engine is cool and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Remove and retain eight screws (Figure 5, Item 15), lock washers (Figure 5, Item 14), and flat washers (Figure 5, Item 13) from circuit breaker cover plate (Figure 5, Item 12). Remove and retain circuit breaker cover plate (Figure 5, Item 12) from control panel (Figure 5, Item 1).
4. Remove and retain two countersunk screws (Figure 5, Item 16) from control panel (Figure 5, Item 1).
5. Remove and retain four screws (Figure 5, Item 22), lock washers (Figure 5, Item 23) and flat washers (Figure 5, Item 24) that secure control panel (Figure 5, Item 1) to Genset.
6. Raise control panel (Figure 5, Item 1) to gain access to electrical connections on switch (Figure 5, Item 9).
7. Loosen but do not remove two screws securing electrical connections (Figure 5, Item 10) to switch (Figure 5, Item 9).
8. Mark and remove electrical connections (Figure 5, Item 10) from switch (Figure 5, Item 9).
9. Remove and retain switch (Figure 5, Item 9) by prying up on metal latch of switch (Figure 5, Item 9).
10. Remove and retain bracket (Figure 5, Item 8) by expanding metal clamp with small screw driver.

REMOVAL - Continued

11. Remove and retain mounting nut (Figure 5, Item 7).
12. Remove plunger (Figure 5, Item 18) and label (Figure 5, Item 17) from front of control panel (Figure 5, Item 1).

END OF TASK**REPLACEMENT**

1. Insert plunger (Figure 5, Item 18) through label (Figure 5, Item 17) and control panel (Figure 5, Item 1). Secure using mounting nut (Figure 5, Item 7).
2. Expand metal clamp of bracket (Figure 5, Item 8) with small screw driver and install onto plunger (Figure 5, Item 18).
3. Orientate and install switch (Figure 5, Item 9) onto bracket (Figure 5, Item 8).
4. Connect wiring harness terminals (Figure 5, Item 10) to switch (Figure 5, Item 9) and secure by tightening set screws.
5. Align two countersunk screws (Figure 5, Item 16) with clips (Figure 5, Item 11) and secure control panel (Figure 5, Item 1) to barrier panel.
6. Install circuit breaker cover plate (Figure 5, Item 12) and secure to control panel (Figure 5, Item 1) using eight screws (Figure 5, Item 15), lock washers (Figure 5, Item 14), and flat washers (Figure 5, Item 13).
7. Secure control panel (Figure 5, Item 1) to Genset using four screws (Figure 5, Item 22), lock washers (Figure 5, Item 23) and flat washers (Figure 5, Item 24).
8. Connect negative terminal to battery (see WP 0056). Start Genset (Figure 5, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET – CONTROL PANEL GAUGES AND METERS

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- AC AMPERES meter
- HERTZ meter
- A-C KILOWATTS meter
- A-C VOLTS meter
- DC VOLTS meter
- COOLANT TEMP gauge
- HOUR meter
- OIL PRESSURE gauge
- BATTERY CHARGER AMPS meter

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0043) for troubleshooting, (Figures FO-6 through FO-13) for electrical schematics and wiring diagrams.

AC METERS ADJUSTMENT/REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Multimeter (WP 0132, Item 2)
Safety glasses

Materials/Parts

Meter(s)

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005, WP 0056, WP 0043,
FO-6 through FO-13

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

REMOVAL**WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is common to the following meters:

- AC AMPERES meter
- HERTZ meter
- A-C KILOWATTS meter
- A-C VOLTS meter

ADJUSTMENT

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
2. Open door and control panel, allow control panel to drop down and hang from lanyards.
3. Set multimeter for appropriate function and range.
4. Using multimeter, measure across meter and compare readings.
5. If necessary, adjust meter to match reading on multimeter.
6. If meter will not adjust in, replace as described in this WP.

END OF TASK

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
3. Disconnect negative terminal from battery (see WP 0056).
4. Open door and control panel, allow control panel to drop down and hang from lanyards.
5. Remove and retain two nuts (Figure 1, Item 5) and lock washers (Figure 1, Item 6) that secure terminals (Figure 1, Item 7) to meter (Figure 1, Item 8).
6. Mark and disconnect terminals (Figure 1, Item 7) from meter (Figure 1, Item 8).
7. Remove and retain three nuts (Figure 1, Item 4), lock washers (Figure 1, Item 3) and flat washers (Figure 1, Item 2) that secure meter (Figure 1, Item 8) to control panel (Figure 1, Item 1).
8. Remove meter (Figure 1, Item 8) from control panel (Figure 1, Item 1).

END OF TASK**REPLACEMENT****NOTE**

If necessary, refer to (WP 0043) for troubleshooting, (Figures FO-6 through FO-13) for electrical schematics and wiring diagrams.

1. Insert meter (Figure 1, Item 8) into control panel (Figure 1, Item 1).
2. Secure meter (Figure 1, Item 8) to control panel (Figure 1, Item 1) using three flat washers (Figure 1, Item 2), lock washers (Figure 1, Item 3) and nuts (Figure 1, Item 4).
3. Connect terminals (Figure 1, Item 7) to appropriate connections on meter (Figure 1, Item 8) (See Table 1).
4. Secure terminals (Figure 1, Item 7) using two nuts (Figure 1, Item 5) and lock washers (Figure 1, Item 6).
5. Close control panel and secure to Genset.
6. Connect negative terminal to battery (see WP 0056) and start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
7. Observe readings on meter (Figure 1, Item 8). If readings are not correct proceed to adjustment procedure.

Table 1. Meter Connections.

METER ID	SCHEMATIC ID	METER CONNECTIONS	
		+	-
AC AMPERES	M1 AmA 0-100 AMPS	79-SW1-13	78-SW1-19
		80-CF2-21	
		50A-PNL-GND	
HERTZ	M2 FM 55-65 Hz	76-CF2-22	75-SW1-3
A-C KILOWATTS	M3 kWm 0-30 kW	82-CF2-13	81-CF2-22
A-C VOLTS	M4 VmA 0-300 VOLTS	84-SW1-6	83-SW1-6

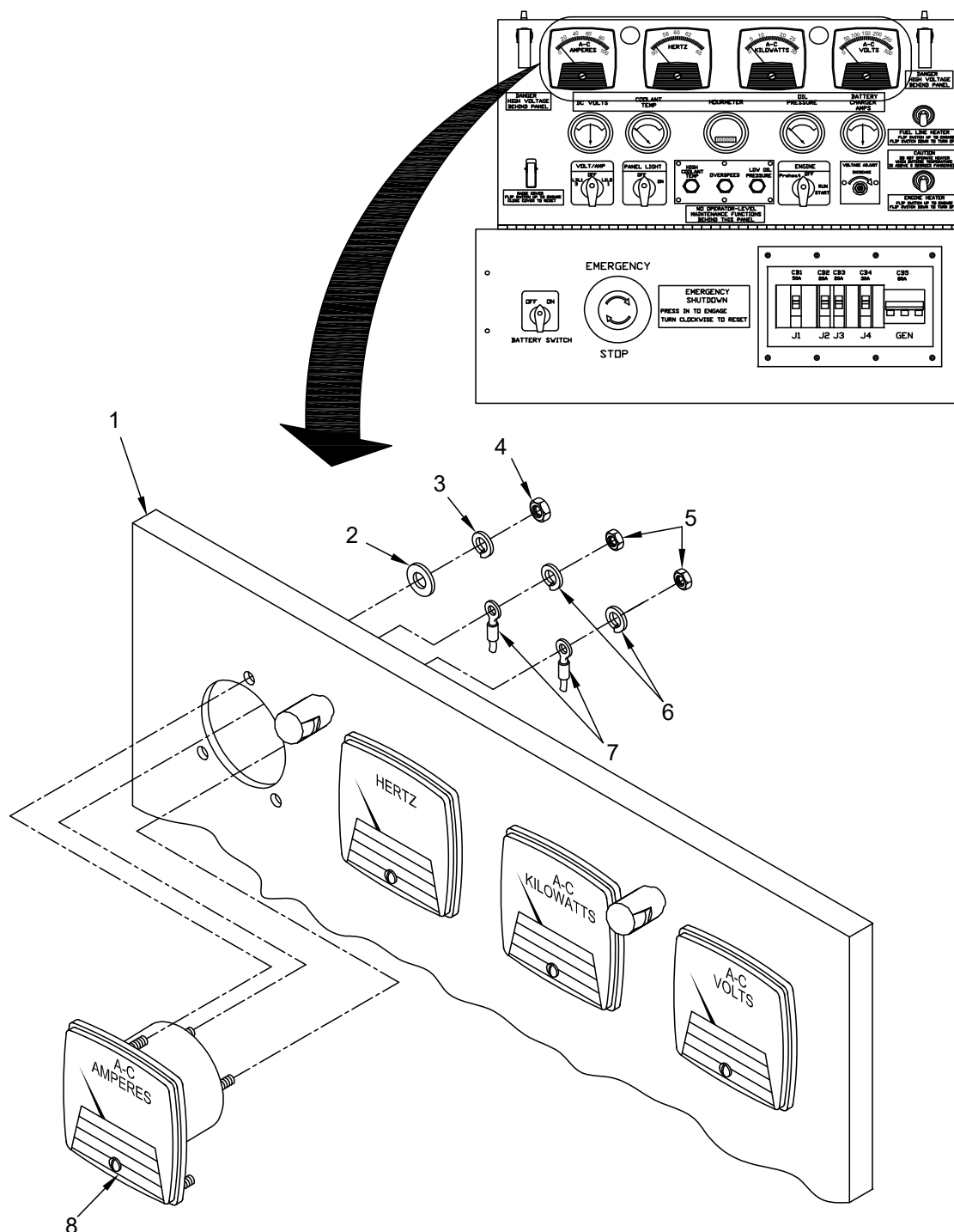


Figure 1. Meter Removal/Replacement.

END OF TASK

GAUGES AND METERS TEST/REMOVAL/REPLACEMENT**INITIAL SETUP:****Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Multimeter (WP 0132, Item 2)
Safety glasses

Materials/Parts

Oil pressure gauge
Coolant temp gauge
DC volts meter
Battery charger meter

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005, WP 0056, WP 0043,
FO-6 through FO-13

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

METER TESTS**DC VOLTS Meter****NOTE**

The DC VOLTS meter receives signal from Engine Start Switch.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
2. Open door and control panel, allow control panel to drop down and hang from lanyards.
3. Set multimeter to measure 28 VDC.
4. Attach ground (negative) lead of multimeter to ground wire (# 44-M6-G) of DC VOLTS meter.
5. Attach positive lead of multimeter to positive wire (#31-SW3-6) of DC VOLTS meter.
6. On front of control panel:
 - a. Set BATTERY SWITCH to ON.
 - b. Set ENGINE switch to RUN.
7. Compare reading on multimeter to reading on DC VOLTS meter. If readings do not match, replace DC VOLTS meter.

END OF TASK

BATTERY CHARGER AMPS Meter**NOTE**

During normal operation Battery Charger should read 3-4 amps.

1. Open door and control panel, allow control panel to drop down and hang from lanyards.
2. Set multimeter to measure DC Amps.
3. Disconnect wire (# 38-SW2-1) from BATTERY CHARGER AMPS meter and connect to positive lead of multimeter.
4. Disconnect wire (# 39-CF2-12) from BATTERY CHARGER AMPS meter and connect to negative lead of multimeter.
5. Plug in Battery Charger and check reading on multimeter.
6. Connect wire (# 38-SW2-1) to BATTERY CHARGER AMPS meter.
7. Connect wire (# 39-CF2-12) to BATTERY CHARGER AMPS meter.
8. Compare reading on BATTERY CHARGER AMPS meter to reading recorded on multimeter, if readings are not consistent replace as described in this WP.

END OF TASK**GAUGE TESTS****OIL PRESSURE Gauge**

1. Open door and control panel, allow control panel to drop down and hang from lanyards.
2. Set multimeter to measure resistance.
3. Disconnect wire (# 15-CF2-6) from OIL PRESSURE gauge and connect to positive lead of multimeter.
4. Attach ground (negative) lead of multimeter to center connection on OIL PRESSURE gauge.
5. Using multimeter, take resistance reading from sensor on OIL PRESSURE gauge.
6. Start Genset (Genset Start Procedure (WP 0005)) and allow to run for 1 minute.
7. Using multimeter, take second resistance reading from sensor on OIL PRESSURE gauge. Resistance should reduce as oil pressure goes up.
 - a. If resistance does not reduce, replace oil pressure sensor (see WP 0046 of this TM).
 - b. If resistance does reduce disconnect multimeter and connect wire (# 15-CF2-6) to OIL PRESSURE gauge.
8. Observe OIL PRESSURE gauge. If OIL PRESSURE gauge does not move replace as described in this WP.

END OF TASK

COOLANT TEMP Gauge

1. Start with cold engine.
2. Open door and control panel, allow control panel to drop down and hang from lanyards.
3. Set multimeter to measure resistance.
4. Disconnect wire (# 14-CF2-5) from COOLANT TEMP gauge and attach to positive lead of multimeter.
5. Attach ground (negative) lead of multimeter to center connection on COOLANT TEMP gauge.
6. Using multimeter, take resistance reading from sensor on COOLANT TEMP gauge.
7. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM and allow to run for 15 minutes.
8. Using multimeter, take second resistance reading from sensor on COOLANT TEMP gauge. Resistance should decrease as temperature goes up.
 - a. If resistance does not decrease, replace temperature sensor (see WP 0055 of this TM).
 - b. If resistance decreases, disconnect multimeter and connect wire (# 14-CF2-5) to COOLANT TEMP gauge.
9. Observe COOLANT TEMP gauge. If gauge does not move replace as described in this WP.

END OF TASK**REMOVAL****WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is common to the following meters:

- DC VOLTS meter
- BATTERY CHARGER meter
- COOLANT TEMP gauge
- OIL PRESSURE gauge

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.

REMOVAL - Continued**NOTE**

DC VOLTS and BATTERY CHARGER have connections on two of three terminals. COOLANT TEMP and OIL PRESSURE have connections on all three terminals.

4. Remove and retain nuts(s) (Figure 2, Item 4) and lock washer(s) (Figure 2, Item 3) that secure terminals (Figure 2, Item 2) to meter/gauge (Figure 1, Item 13).
5. Mark and disconnect terminals (Figure 2, Item 2) from meter/gauge (Figure 2, Item 13).
6. Remove and retain two nuts (Figure 2, Item 7), lock washers (Figure 2, Item 6) and bracket (Figure 2, Item 5) that secure meter/gauge (Figure 2, Item 13) to control panel (Figure 2, Item 1).
7. Remove meter/gauge (Figure 2, Item 13) from control panel (Figure 2, Item 1).

END OF TASK**REPLACEMENT**

1. Install meter/gauge (Figure 2, Item 13) through control panel (Figure 2, Item 1).
2. Secure meter/gauge (Figure 2, Item 13) to control panel (Figure 2, Item 1) with bracket (Figure 2, Item 5) two nuts (Figure 2, Item 7) and lock washers (Figure 2, Item 6).

NOTE

DC VOLTS and BATTERY CHARGER have connections on two of three terminals. COOLANT TEMP and OIL PRESSURE have connections on all three terminals. Refer to Table 2 or FO-6 through FO-13 for proper connections.

3. Connect terminals (Figure 2, Item 2) to meter/gauge (Figure 2, Item 13).
4. Secure terminals (Figure 2, Item 2) to meter/gauge (Figure 2, Item 13) using nuts(s) (Figure 2, Item 4) and lock washer(s) (Figure 2, Item 3).
5. Close control panel and secure to Genset.
6. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 2. Meter/Gauge Connections.

METER/GAUGE ID	SCHEMATIC ID	METER CONNECTIONS		
		Negative (I)	Positive (S)	Ground (G)
DC VOLTS	M5 VmD	31-SW3-6	no connection	44-M6-G
COOLANT TEMP	M6 CTG	30-R2-2	14-CF2-5	44-M5-G
OIL PRESSURE	M8 OPG	30-R2-2	15-CF2-6	50B-SW8-1
				40-CF2-13
				41-M6-G
				47-1 5-1
				46-1 4-1
BATTERY CHARGER	M9 AmD	38-SW2-1	39-CF2-12	no connection

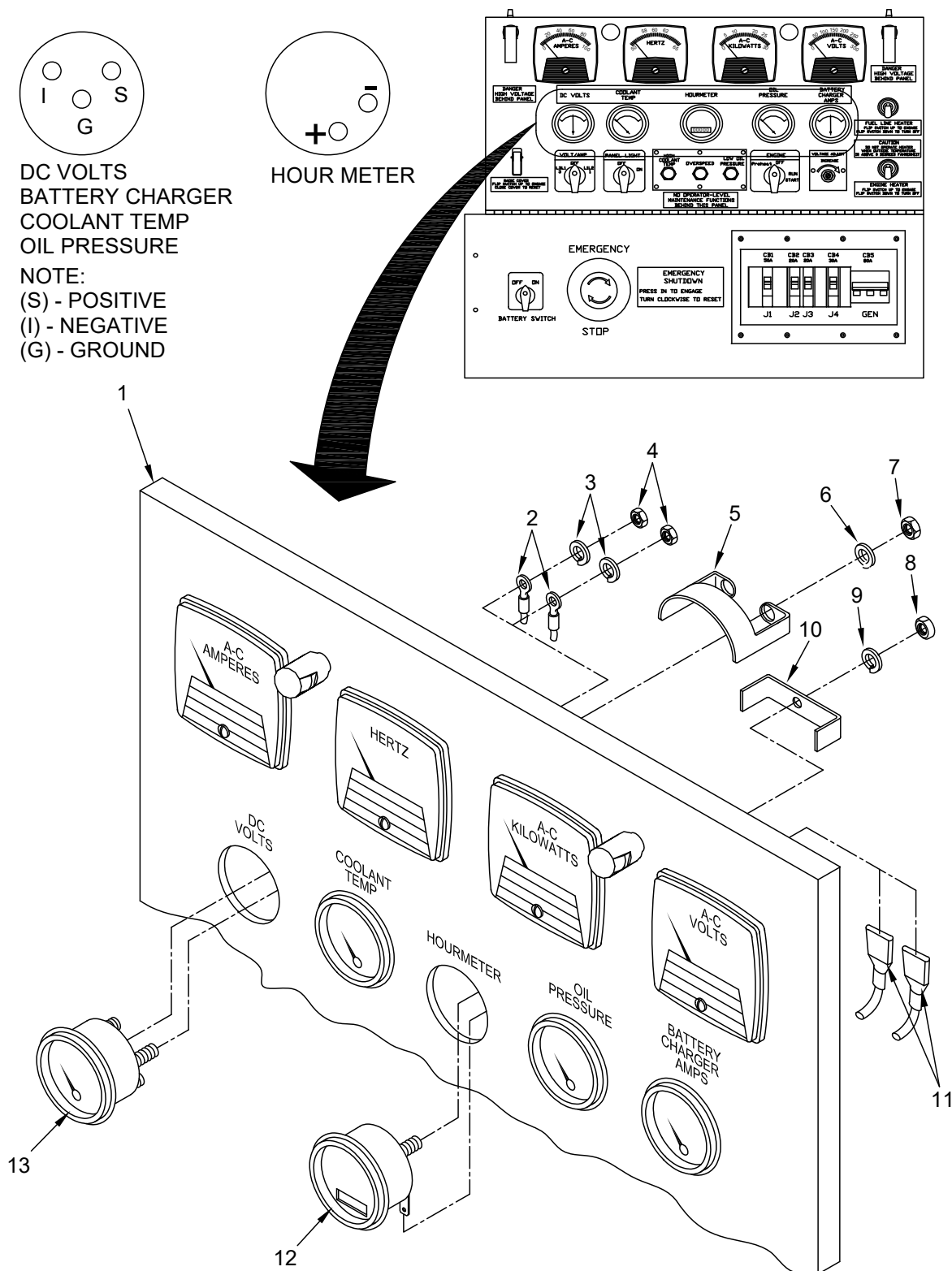


Figure 2. Meter/Gauge Removal/Replacement.

END OF TASK

HOURLY METER TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Multimeter (WP 0132, Item 2)
Safety glasses

Materials/Parts

Hour meter

Personnel Required

Power Generation Equipment
Mechanic, MOS 91D (1)

References

WP 0005, WP 0056, WP 0043,
FO-6 through FO-13

Equipment Condition

Genset shut down
BATTERY SWITCH - OFF

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

TEST

1. Open door and control panel, allow control panel to drop down and hang from lanyards.
2. Set multimeter to measure 24 VDC.
3. Disconnect wire (# 26-CF2-8) from positive (+) terminal on HOUR METER and connect to positive lead of multimeter.
4. Disconnect wire (# 44-M6-G) from (-) negative terminal on HOUR METER and connect to negative lead of multimeter.
5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
6. Observe multimeter. Multimeter should read approximately 24 VDC.
 - a. If multimeter does not read 24 VDC, troubleshoot engine/wiring.
 - b. If multimeter does read 24 VDC, replace HOUR METER as described in this WP.

END OF TASK

REMOVAL**WARNING**

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Mark and disconnect two terminals (Figure 2, Item 11) from hour meter (Figure 2, Item 12).
5. Remove and retain nut (Figure 2, Item 8), lock washer (Figure 2, Item 9) and bracket (Figure 2, Item 10) that secures hour meter (Figure 2 Item 12) to control panel (Figure 2, Item 1).
6. Remove hour meter (Figure 2, Item 12) from control panel (Figure 2, Item 1).

END OF TASK**REPLACEMENT**

1. Install hour meter (Figure 2, Item 12) through control panel (Figure 2, Item 1).
2. Secure hour meter (Figure 2, Item 12) to control panel (Figure 2, Item 1) with bracket (Figure 2, Item 10) nut (Figure 2, Item 8) and lock washer (Figure 2, Item 9).
3. Connect two terminals (Figure 2, Item 11) to hour meter (Figure 2, Item 12).
4. Close control panel and secure to Genset.
5. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 3. Hour Meter Connections.

METER/GAUGE ID	SCHEMATIC ID	METER CONNECTIONS	
		(+)	(-)
HOURL METER	M7 HM	26-CF2-8	44-M6-G

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET – CONTROL PANEL WIRING HARNESS

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. It consists of:

- Control panel wiring harness removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

CONTROL PANEL WIRING HARNESS REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Safety glasses

Reference

WP 0005, WP 0056
FO-6 through FO-12

Materials/Parts

Wiring harness
Strap-ties (WP 0180, Item 55 to 57)

Equipment Condition

Genset Shut Down
BATTERY SWITCH - OFF

Personnel Required

One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL**NOTE**

If necessary, refer to (Figure 1) for component location and to (Figures FO-6 through FO-12) for electrical schematic/wiring diagrams.

Replacing the entire wiring harness should be a last resort. Always attempt to replace individual terminals or individual wires before doing a total replacement of the wiring harness.

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Remove and retain nuts and lock washers that secure wiring harness to all AC meters (A-C-AMPERES, HERTZ, A-C KILOWATTS, A-C VOLTS) on control panel.
5. Mark and disconnect all wiring harness terminals from all AC meters of control panel.
6. Remove and retain nuts and lock washers that secure wiring harness to gauges (COOLANT TEMP and OIL PRESSURE) and remaining meters (DC VOLTS, HOURMETER and BATTERY CHARGER AMPS) on control panel.
7. Mark and disconnect all wiring harness terminals from gauges and meters of control panel.
8. Loosen but do not remove hardware that secures wiring harness terminals to rotary switches (VOLT/AMP, PANEL LIGHT and ENGINE).

REMOVAL - Continued

9. Mark and disconnect all wiring harness terminals from rotary switches on control panel.
10. Disconnect all wiring harness terminals from toggle switches (BATTLE SHORT, ENGINE HEATER and FUEL LINE HEATER) on control panel.
11. Disconnect leads coming off of VOLTAGE ADJUST potentiometer from wiring harness.
12. Disconnect leads coming off of panel lights, HIGH COOLANT TEMP, OVERSPEED, and LOW OIL PRESSURE from wiring harness.
13. Disconnect wiring harness connector CF2 from mating plug.
14. Remove all strap ties securing wiring harness to control panel and remove wiring harness.

END OF TASK**REPLACEMENT****NOTE**

If necessary, refer to (Figure 1) for component location and to (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

1. Inspect new wiring harness for completeness. Verify that all terminals are present, wiring harness is not damaged and CF2 connector is complete.
2. Lay wiring harness onto control panel and loosely strap tie into place.
3. Connect appropriate wiring harness leads to panel lights, HIGH COOLANT TEMP, OVERSPEED, and LOW OIL PRESSURE lights.
4. Connect appropriate wiring harness leads coming off of VOLTAGE ADJUST potentiometer.
5. Connect appropriate wiring harness leads to toggle switches (BATTLE SHORT, ENGINE HEATER and FUEL LINE HEATER).
6. Connect appropriate wiring harness leads to rotary switches (VOLT/AMP, PANEL LIGHT and ENGINE) and tighten all set screws.
7. Connect appropriate wiring harness leads to gauges (COOLANT TEMP and OIL PRESSURE) and meters (DC VOLTS, HOURMETER and BATTERY CHARGER AMPS) and install all associated hardware.
8. Connect appropriate wiring harness leads to AC meters (A-C- AMPERES, HERTZ, A-C KILOWATTS, A-C VOLTS) and install all associated hardware.
9. Connect CF2 connector to mating end.
10. Lay wiring harness against control panel and tighten all strap ties.
11. Close and secure control panel to Genset.
12. Connect negative terminal to battery (see WP 0056). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) in this TM.

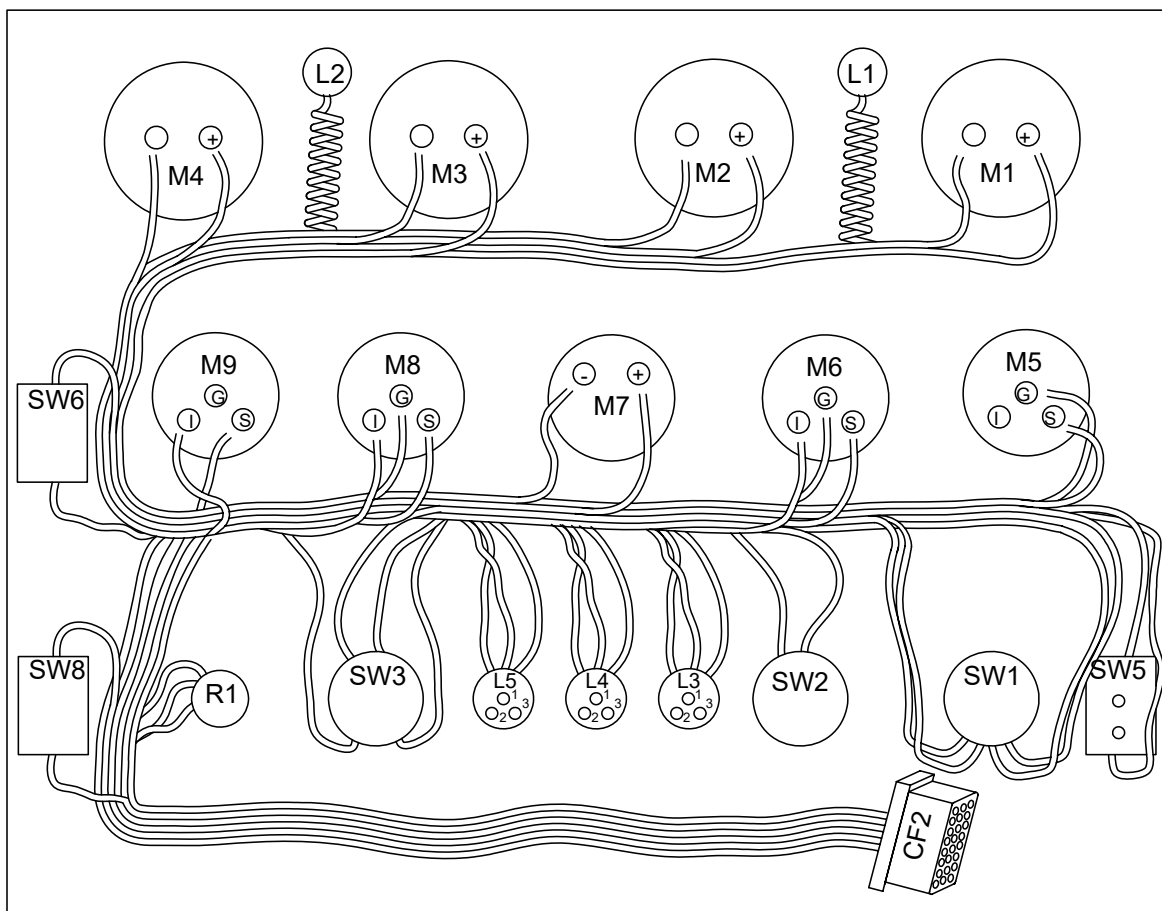


Figure 1. Control Panel Component Identification.

Table 1. Component Identification.

Component Identifier	Control Panel Marking	Component Identifier	Control Panel Marking
M1	A-C- AMPERES meter	SW1	VOLT/AMP switch
M2	HERTZ meter	SW2	PANEL LIGHT switch
M3	A-C KILOWATTS meter	SW3	ENGINE switch
M4	A-C VOLTS meter	SW5	BATTLE SHORT switch
M5	DC VOLTS meter	SW6	FUEL LINE HEATER switch
M6	COOLANT TEMP gauge	SW8	ENGINE HEATER switch
M7	HOURLY meter		
M8	OIL PRESSURE gauge	L1	Panel light
M9	BATTERY CHARGER AMPS meter	L2	Panel light
		L3	HIGH COOLANT TEMP light
R1	VOLTAGE ADJUST potentiometer	L4	OVERSPEED light
		L5	LOW OIL PRESSURE light
CF2	Cable connector		

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL – CIRCUIT BREAKERS

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. Consisting of:

- Circuit Breaker (CB1) 50 AMP: ECU POWER SUPPLY removal/replacement
- Circuit Breaker (CB2) 20 AMP ON BOARD POWER LEAD removal/replacement
- Circuit Breaker (CB3) 20 AMP: ON BOARD POWER LEAD removal/replacement
- Circuit Breaker (CB4) 30 AMP: PDU POWER SUPPLY removal/replacement
- Circuit Breaker (CB5) 80 AMP: MAIN POWER BREAKER removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

CIRCUIT BREAKER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

ReferenceWP 0005, WP 0056,
WP 0084, FO-6 through FO-12**Materials/Parts**

Circuit Breaker

Equipment ConditionGenset Shut Down
BATTERY SWITCH - OFF**Personnel Required**One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedures apply to all circuit breakers.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and remove bottom half of control panel (see WP 0084).
4. Mark electrical connections (Figure 1, Item 5) on circuit breaker (Figure 1, Item 3) being replaced.
5. Loosen terminal screws (Figure 1, Item 6) securing electrical connections (Figure 1, Item 5).
6. Remove electrical connections (Figure 1, Item 5) from circuit breaker (Figure 1, Item 3).

NOTE

For CB1 through CB4, tab (Figure 1, Item 2) is located at top. For CB5, two tabs (not shown) are located at bottom of circuit breaker.

7. Lift up on tab (Figure 1, Item 2) of circuit breaker (Figure 1, Item 3) being replaced.
8. Remove circuit breaker (Figure 1, Item 3) from mounting bracket (Figure 1, Item 4) on barrier panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT**NOTE**

For CB1 through CB4, tab (Figure 1, Item 2) is located at top. For CB5, two tabs (not shown) are located at bottom of circuit breaker.

1. Install circuit breaker (Figure 1, Item 3) onto mounting bracket (Figure 1, Item 4) of barrier panel (Figure 1, Item 1) and secure with tab (Figure 1, Item 2).

NOTE

If necessary, refer to (Table 1) or (FO-6 through FO-12) for electrical schematic.

2. Loosen terminal screws (Figure 1, Item 6) of circuit breaker (Figure 1, Item 3) and install electrical connections (Figure 1, Item 5). Torque terminal screws (Figure 1, Item 6) of circuit breaker (Figure 1, Item 3) to 45 in-lbs.
3. Install bottom half of control panel (see WP 0084).
4. Connect negative terminal to battery (see WP 0056).
5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Circuit Breaker Connections.

CIRCUIT BREAKER	TERMINAL	HARNESS CONNECTION	TERMINAL	HARNESS CONNECTION
CB1	1	131-PTB1-2	2	106-CM3-3
	3	132-PTB1-8		228-J1-A-#6 THNN BK
	5	133-PTB2-2		229-J1-B-#6 THNN RD
CB2	1	141-PTB1-1	2	230-J1-C-#6 THNN BL
				116-CM3-5
CB3	1	142-PTB1-7	2	145-CM4-10
				126-CM3-7
CB4	1	151-PTB1-4	2	146-CM4-11
	3	152-PTB1-10	4	128-CM3-8
	5	153-PTB2-4	6	252-J4-A-#6 THNN BK
CB5	1	111-PTB1-L1	2	253-J4-B-#6 THNN RD
	3	112-PTB1-L2	4	254-J4-C-#6 THNN BL
	5	113-PTB2-L3	6	51-F1-1
				248-GEN-BLK
				52-F2-1
				249-GEN-RED
				53-F3-1
				250-GEN-BLUE

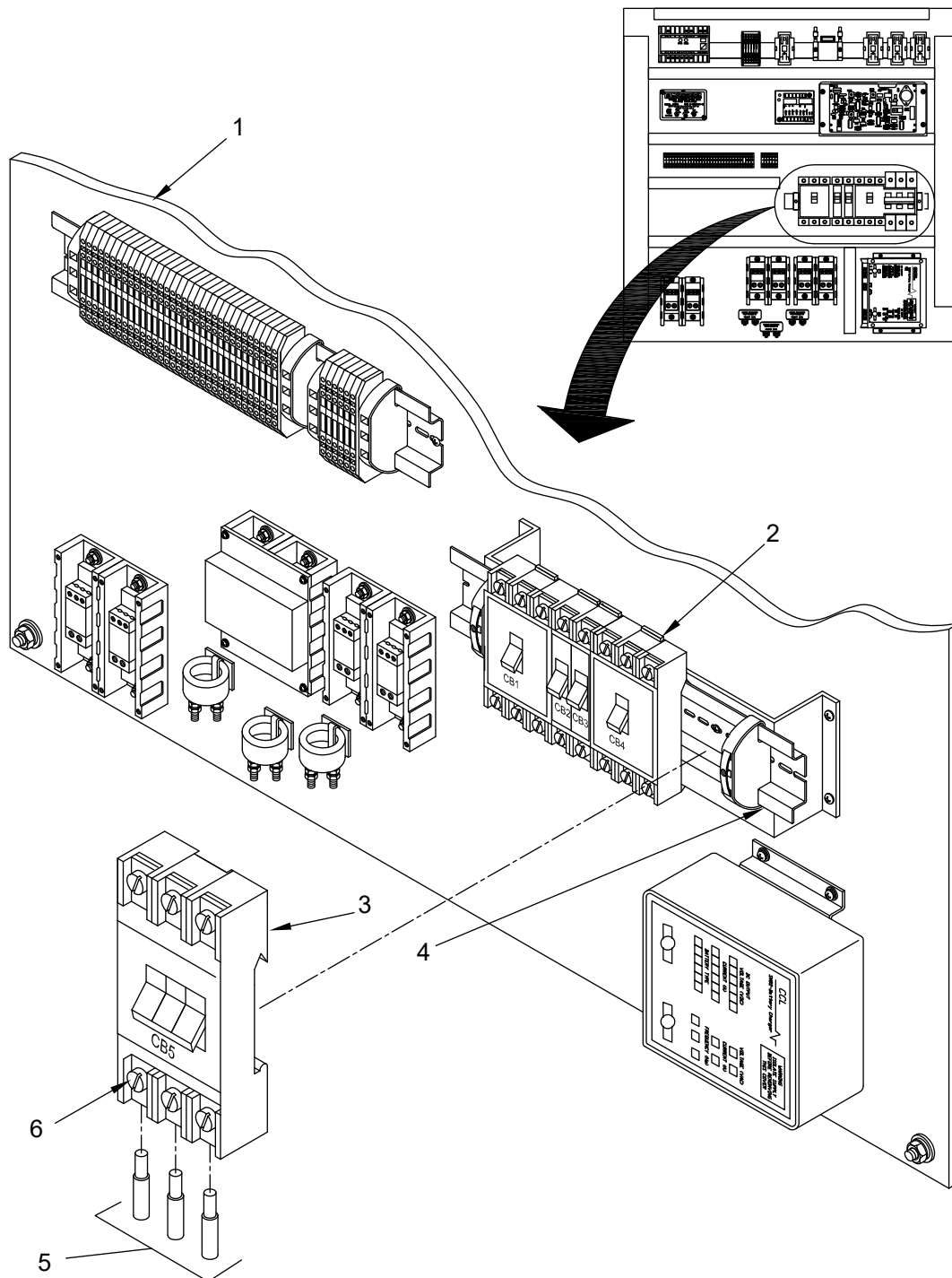


Figure 1. Circuit Breaker Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET – POWER DISTRIBUTION PANEL CONNECTORS AND PANEL LIGHTS

GENERAL

This work package provides information on the removal and replacement of components on the Genset control panel. They consist of:

- Power distribution panel lights removal/replacement
- Power distribution panel J1 and J4 connector removal/replacement
- Power distribution panel J2 and J3 connector removal/replacement
- Power distribution panel J5 connector removal/replacement
- Power distribution panel J6 connector removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

POWER DISTRIBUTION PANEL LIGHTS REMOVAL/REPLACEMENT (Old Version)

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Reference

WP 0005, WP 0056, FO-6 through FO-12

Materials/Parts

Panel light

Equipment ConditionGenset Shut Down
BATTERY SWITCH - OFF**Personnel Required**One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to all lights on the power distribution panel.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 1, Item 1).
5. Remove and retain 12 bolts (Figure 1, Item 7) and flat washers (Figure 1, Item 6) that secure power distribution panel (Figure 1, Item 1) to Genset.
6. Remove power distribution panel (Figure 1, Item 1) and lay face down.
7. Slide wire cover (Figure 1, Item 4) off of light (Figure 1, Item 12) being replaced.
8. Mark and disconnect three terminals (Figure 1, Item 5) from light (Figure 1, Item 12) being replaced.
9. Remove and retain nut (Figure 1, Item 3) and lock washer (Figure 1, Item 2) that secures light (Figure 1, Item 12) to power distribution panel (Figure 1, Item 1).
10. Remove indicator light (Figure 1, Item 12) from power distribution panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT**NOTE**

Inspect all terminals and associated wires. If necessary replace or repair.

1. Adjust nut (Figure 1, Item 10) on indicator light (Figure 1, Item 12) to allow sufficient threads to come through power distribution panel (Figure 1, Item 1).
2. Insert indicator light (Figure 1, Item 12), lock washer (Figure 1, Item 11) and nut (Figure 1, Item 10) through power distribution panel (Figure 1, Item 1).
3. Install nut (Figure 1, Item 3) and lock washer (Figure 1, Item 2) and secure indicator light (Figure 1, Item 11) to power distribution panel (Figure 1, Item 1).

NOTE

If necessary, refer to (FO-6 through FO-12) for electrical schematic.

4. Connect three terminals (Figure 1, Item 5) to light (Figure 1, Item 12) and slide wire cover (Figure 1, Item 4) over connections.
5. Place power distribution panel (Figure 1, Item 1) onto Genset and secure using 12 bolts (Figure 1, Item 7) and flat washers (Figure 1, Item 6).
6. Connect all cables to power distribution panel (Figure 1, Item 1).
7. Connect negative terminal to battery (see WP 0056). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Genset Power Distribution Panel – Light Connections (Old Version).

LIGHT LOCATION	SCHEMATIC ID	CONNECTION		
		1	2	3
J1 120/208 VOLTS 60 AMP	L6	117-CF3-6	106-CF3-3	149-CF3-9
J2 120 VOLTS 20 AMPERE	L7	117-CF3-6	116-CF3-5	149-CF3-9
J3 120 VOLTS 20 AMPERE	L8	117-CF3-6	126-CF3-7	149-CF3-9
J4 120/208 VOLTS 30 AMP	L9	117-CF3-6	128-CF3-8	149-CF3-9
J5 120 VOLTS INPUT	L10	117-CF3-6	99-CF3-1	149-CF3-9

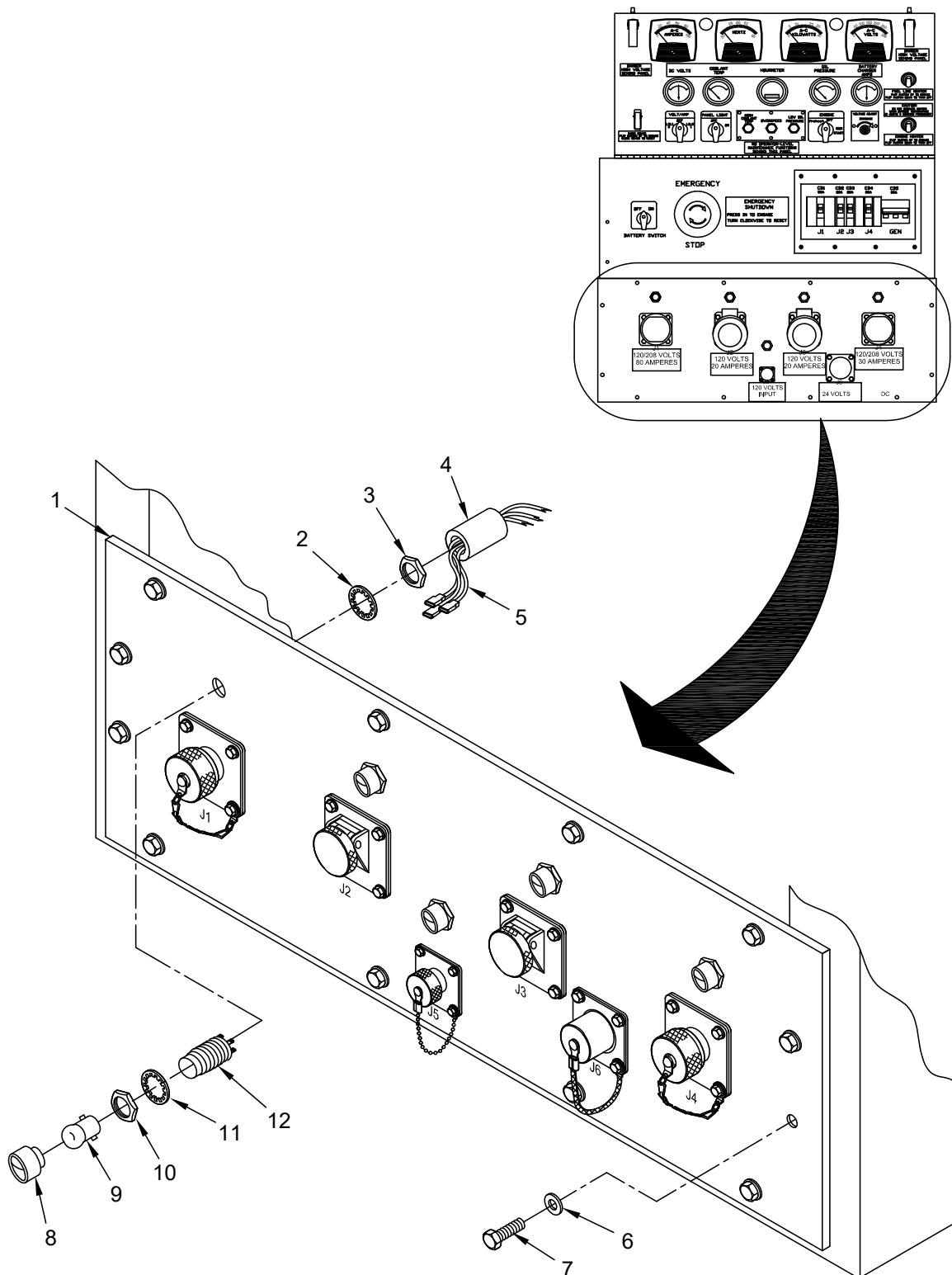


Figure 1. Power Distribution Panel Lights (old version) Removal/Replacement.

END OF TASK

POWER DISTRIBUTION PANEL LIGHTS REMOVAL/REPLACEMENT (New Version)

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

ReferenceWP 0005, WP 0056,
FO-6 through FO-12**Materials/Parts**

Panel light

Equipment ConditionGenset Shut Down
BATTERY SWITCH - OFF**Personnel Required**One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to all lights on the new version power distribution panel.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 2, Item 1).
5. Remove and retain 12 bolts (Figure 2, Item 7) and flat washers (Figure 2, Item 6) that secure power distribution panel (Figure 2, Item 1) to Genset.
6. Remove power distribution panel (Figure 2, Item 1) and lay face down.
7. Slide wire cover (Figure 2, Item 4) off of light (Figure 2, Item 12) being replaced.
8. Mark and disconnect two terminals (Figure 2, Item 5) from light (Figure 2, Item 8) being replaced.
9. Remove and retain nut (Figure 2, Item 3) and metal gasket (Figure 2, Item 2) that secures light (Figure 2, Item 8) to power distribution panel (Figure 2, Item 1).
10. Remove light (Figure 2, Item 8), black out cover (Figure 2, Item 9), and rubber gasket (Figure 2, Item 10) from power distribution panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT**NOTE**

Inspect all terminals and associated wires. If necessary replace or repair.

1. Insert indicator light (Figure 2, Item 8), Black out cover (Figure 2, Item 9) and Rubber gasket (Figure 2, Item 10) through power distribution panel (Figure 2, Item 1).
2. Install metal gasket (Figure 2, Item 2) and nut (Figure 2, Item 3) and secure indicator light (Figure 2, Item 11) to power distribution panel (Figure 2, Item 1).

NOTE

If necessary, refer to (Table 2) or:

- (Figure FO-15) for schematics (with EMI shielding) (New Version).
 - (Figure FO-16) for schematics (without EMI shielding) (New Version).
3. Connect two terminals (Figure 2, Item 5) to indicator light (Figure 2, Item 8) and slide wire cover (Figure 2, Item 4) over connections.
 4. Install one side of hinge and secure using two screws and bolts (not shown).
 5. Place power distribution panel (Figure 2, Item 1) onto Genset and secure using 12 bolts (Figure 2, Item 7) and flat washers (Figure 2, Item 6).
 6. Connect all cables to power distribution panel (Figure 2, Item 1).
 7. Connect negative terminal to battery (See WP 0045). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 2. Genset Power Distribution Panel – Light Connections (New Version).

LIGHT LOCATION	SCHEMATIC ID	CONNECTION	
		1	2
J1 120/208 VOLTS 70 AMP	L6	117-CF3-6	106-CF3-3
J2 120 VOLTS 20 AMPERE	L7	117-CF3-6	116-CF3-5
J3 120 VOLTS 20 AMPERE	L8	117-CF3-6	126-CF3-7
J4 120/208 VOLTS 30 AMP	L9	117-CF3-6	128-CF3-8
J5 120 VOLTS INPUT	L10	117-CF3-6	99-110-2

NOTE

The door covering the circuit breakers in (Figure 2) has been removed for clarity.

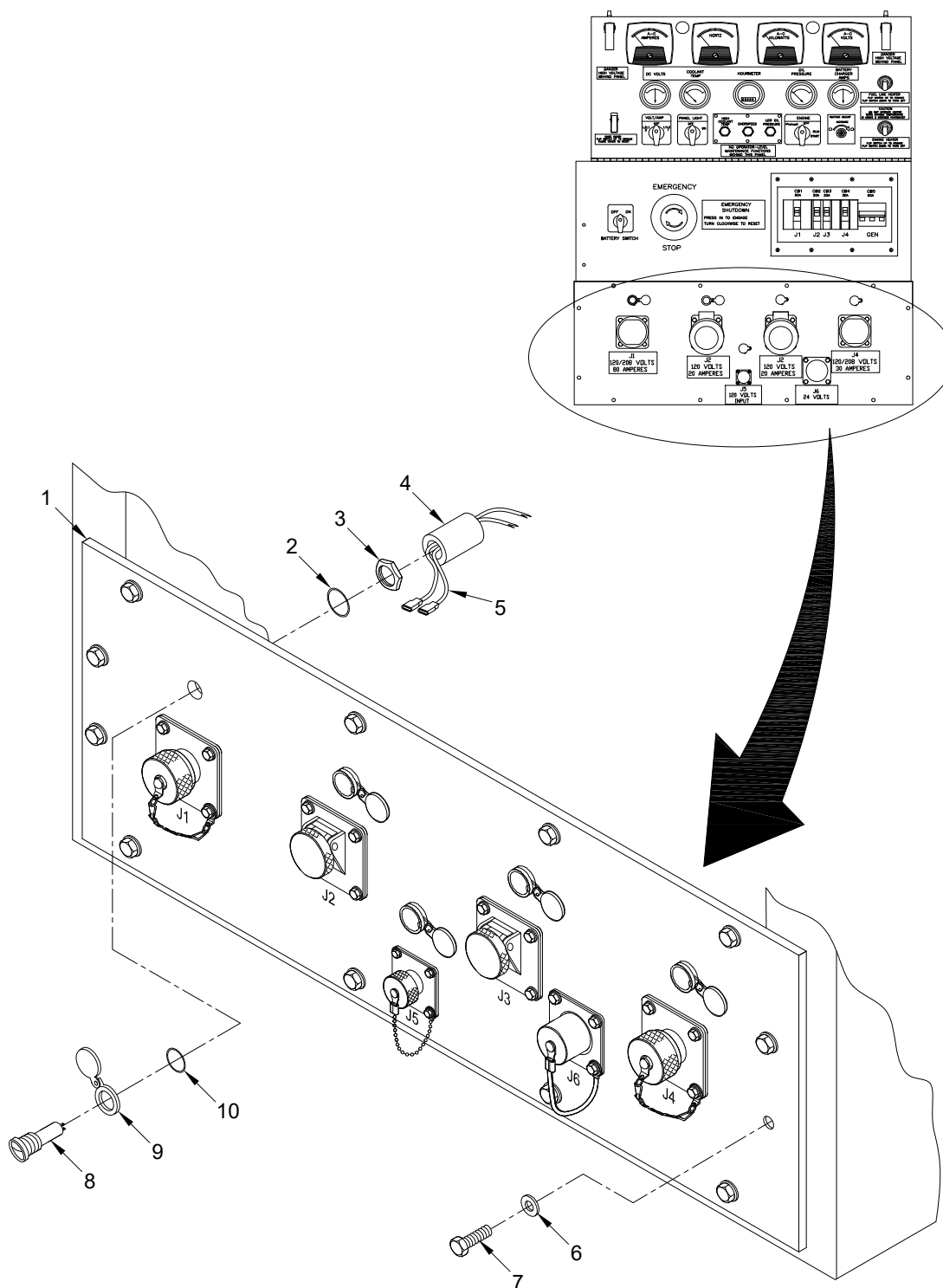


Figure 2. Power Distribution Panel Lights (New Version) Removal/Replacement.

END OF TASK

TM: 1006310

0063-7

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CONNECTOR (J1 & J4) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Reference

WP 0005, WP 0056, FO-6 through FO-12

Materials/PartsConnector
Gasket**Equipment Condition**Genset Shut Down
BATTERY SWITCH - OFF**Personnel Required**One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to both the old and new version (J1 or J4 connectors). For clarity the door protecting the circuit breakers has been removed.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 3, Item 1).
5. Remove and retain 12 bolts (Figure 3, Item 6) and lock washers (Figure 3, Item 5) that secure power distribution panel (Figure 3, Item 1) to Genset.
6. Remove and retain two screws and bolts (not shown) from one side of hinge (Figure 5, Item 2) and lift hinge (Figure 5, Item 2) out of the way.
7. Remove power distribution panel (Figure 3, Item 1) and lay face down.
8. Remove and retain four bolts (Figure 3, Item 9), flat washers (Figure 3, Item 8), nuts (Figure 3, Item 4), lock washers (Figure 3, Item 3) and flat washers (Figure 3, Item 2) that secure connector (J1 or J4) (Figure 3, Item 7), gasket (Figure 3, Item 11) and dust cover (Figure 3, Item 10) to power distribution panel (Figure 3, Item 1).

REMOVAL - Continued

9. Remove connector shell (J1 or J4) (Figure 3, Item 7) from power distribution panel (Figure 3, Item 1) (wires will be attached).
10. Loosen ring (Figure 3, Item 17) from rear of connector shell (Figure 3, Item 12).
11. Slide ring (Figure 3, Item 17) and slide assembly out of connector shell (Figure 3, Item 12).
12. Slide rear insulator (black) (Figure 3, Item 15) and front insulator (red) (Figure 3, Item 13) back to gain access to pins (Figure 3, Item 14) and wiring (Figure 3, Item 16).

NOTE

If replacing connector shell only proceed to step 11 of replacement procedure.

13. Remove pins (Figure 3, Item 14) from associated wires (Figure 3, Item 16).
14. Mark and remove wires (Figure 3, Item 16) from rear insulator (black) (Figure 3, Item 15) and ring (Figure 3, Item 17). Set all pieces aside.

END OF TASK**REPLACEMENT/REPAIR**

1. Inspect all wires (Figure 3, Item 16) for nicks, cuts, burn marks or other damage. If necessary replace with appropriate gauge and color of wire.
2. Inspect gasket (Figure 3, Item 11) for damage or excessive wear and tear, if necessary replace.
3. Feed all wires (Figure 3, Item 16) through power distribution panel (Figure 3, Item 1).
4. Insert wires (Figure 3, Item 16) through ring (Figure 3, Item 17) and appropriate holes in rear insulator (black) (Figure 3, Item 15).
5. Install pins (Figure 3, Item 14) onto wires (Figure 3, Item 16) and secure.
6. Insert pins (Figure 3, Item 14) through front insulator (red) (Figure 3, Item 13).
7. Compress rear insulator (black) (Figure 3, Item 15) and front insulator (red) (Figure 3, Item 13) together and insert into connector shell (Figure 3, Item 12). Slide ring (Figure 3, Item 17) forward and tighten.
8. Properly orientate connector assembly (Figure 3, Item 7) to power distribution panel (Figure 3, Item 1) and insert.

NOTE

When performing the following step, do not tighten hardware until all hardware has been installed.

9. Secure connector assembly (Figure 3, Item 7), gasket (Figure 3, Item 11) and dust cover (Figure 3, Item 10) to power distribution panel (Figure 3, Item 1) using four bolts (Figure 2, Item 9), flat washers (Figure 3, Item 8), nuts (Figure 3, Item 4), lock washers (Figure 3, Item 3) and flat washers (Figure 3, Item 2).
10. Place power distribution panel (Figure 3, Item 1) onto Genset and secure using 12 bolts (Figure 3, Item 6), and washers (Figure 3, Item 5).

REPLACEMENT/REPAIR - Continued

11. Install one side of hinge (Figure 5, Item 2) and secure using two screws and bolts (not shown).
12. Connect all cables to power distribution panel (Figure 3, Item 1).
13. Connect negative terminal to battery (see WP 0056). Flatten Genset in accordance with Genset Flatten Procedure (WP 0005) of this TM.

NOTE

If necessary, refer to (Table 3) or (FO-6 through FO-12) for electrical schematics and wiring diagrams.

Refer to Figure 7 for pin layout of J1 and J4.

Table 3. J1 and J4 Connections.

CONNECTOR	CONNECTIONS				
	A	B	C	N	G
J1 120/208 VOLTS 60 AMP	228-CB1-2	229-CB1-4	230-CB1-6	221-PTB2-11	220-GB-16
J4 120 VOLTS 20 AMPERE	252-CB4-2	253-CB4-4	254-CB4-6	255-PTB2-9	251-GB-7

NOTE

For clarity the door protecting the circuit breakers has been removed.

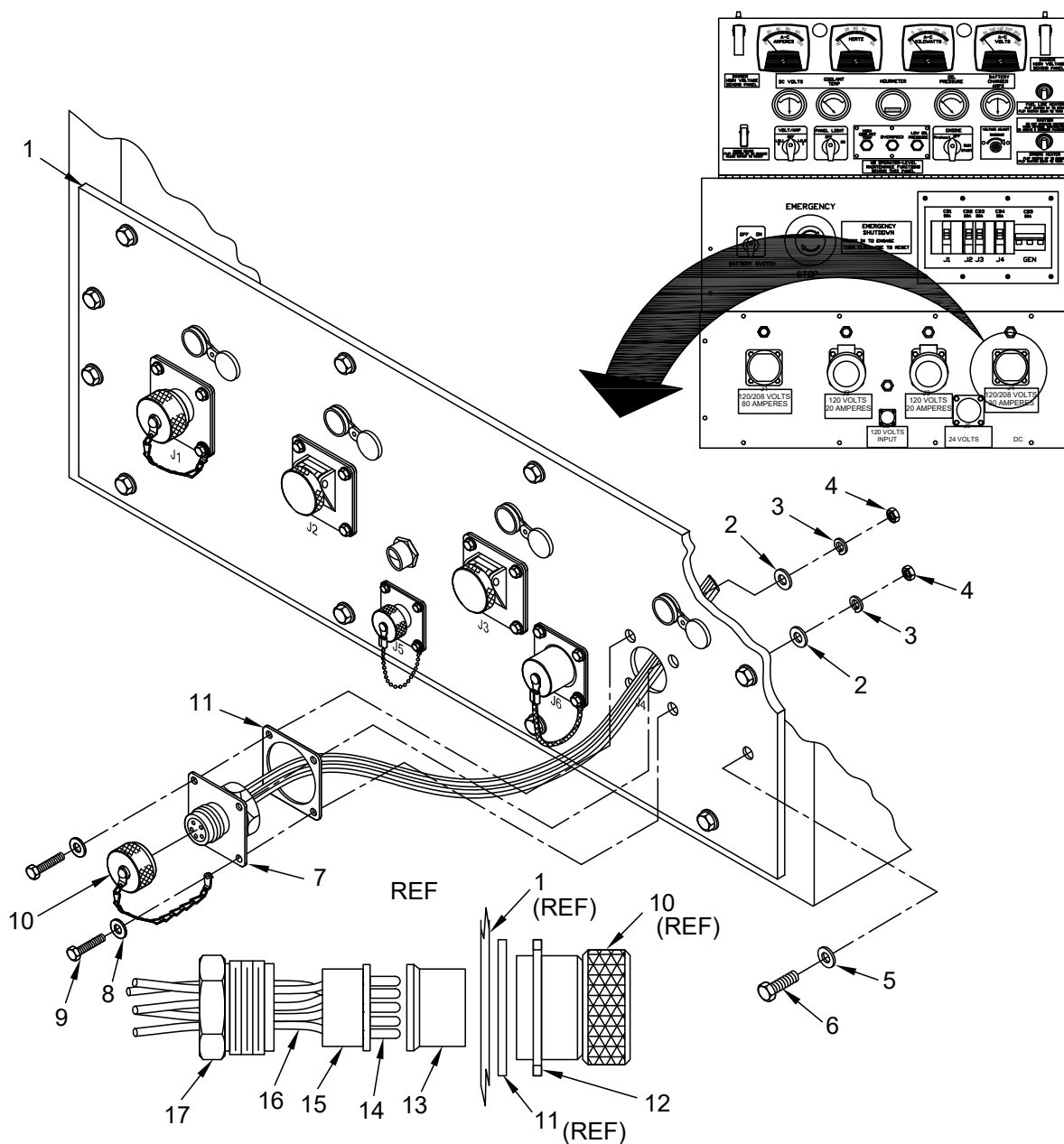


Figure 3. Connector (J1 and J4) Removal/Replacement.

END OF TASK

CONNECTOR (J2 & J3) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Reference

WP 0005, WP 0056, FO-6 through FO-12

Materials/PartsConnector
Gasket**Equipment Condition**Genset Shut Down
BATTERY SWITCH - OFF**Personnel Required**One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to both the old and new version (J2 or J3 connectors).

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 4, Item 1).
5. Remove and retain 12 bolts (Figure 4, Item 6) and lock washers (Figure 4, Item 5) that secure power distribution panel (Figure 4, Item 1) to Genset.
6. Remove and retain two screws and bolts (not shown) from one side of hinge (Figure 4, Item 2) and lift hinge (Figure 4, Item 2) out of the way.
7. Remove power distribution panel (Figure 4, Item 1) and lay face down.
8. Remove and retain four bolts (Figure 4, Item 7), flat washers (Figure 3, Item 8), nuts (Figure 4, Item 4), lock washers (Figure 4, Item 3) and flat washers (Figure 4, Item 2) that secure connector (J2 or J3) (Figure 4, Item 9) and gasket (Figure 4, Item 10) to power distribution panel (Figure 4, Item 1).

REMOVAL - Continued

9. Remove connector shell (J2 or J3) (Figure 4, Item 9) from power distribution panel (Figure 4, Item 1) (wires will be attached).
10. Remove screw (Figure 4, Item 14) from rear of connector (Figure 4, Item 9).
11. Slide back plate (Figure 4, Item 12) away from connector (Figure 4, Item 9) to gain access to pins (Figure 4, Item 11) and wiring (Figure 4, Item 13).
12. Remove pins (Figure 4, Item 11) from associated wires (Figure 4, Item 13).
13. Mark and remove wires (Figure 4, Item 13) from back plate (Figure 4, Item 12). Set all pieces aside.

END OF TASK**REPLACEMENT/REPAIR****NOTE**

If necessary, refer to (Table 4) and (FO-6 through FO-12) for electrical schematics and wiring diagrams.

Refer to (Figure 7) for pin layout of J2 and J3.

1. Inspect all wires (Figure 4, Item 13) for nicks, cuts, burn marks or other damage. If necessary replace with appropriate gauge and color of wire.
2. Inspect gasket (Figure 4, Item 10) for damage or excessive wear and tear, if necessary replace.
3. Feed all wires (Figure 4, Item 13) through power distribution panel (Figure 4, Item 1).
4. Insert wires (Figure 4, Item 13) through back plate (Figure 4, Item 12).
5. Install pins (Figure 4, Item 11) onto wires (Figure 4, Item 13).
6. Secure back plate (Figure 4, Item 12) using screw (Figure 4, Item 14).
7. Properly orientate connector assembly (Figure 4, Item 9) to power distribution panel (Figure 4, Item 1) and insert.

NOTE

When performing the following step, do not tighten hardware until all hardware has been installed.

8. Secure connector assembly (Figure 4, Item 9), gasket (Figure 4, Item 10) to power distribution panel (Figure 4, Item 1) using four bolts (Figure 4, Item 7), flat washers (Figure 4, Item 8), nuts (Figure 4, Item 4), lock washers (Figure 4, Item 3), and flat washers (Figure 4, Item 2).
9. Place power distribution panel (Figure 4, Item 1) onto Genset and secure using 12 bolts (Figure 4, Item 6), and washers (Figure 4, Item 5).
10. Install one side of hinge (Figure 5, Item 2) and secure using two screws and bolts (not shown).

REPLACEMENT/REPAIR – Continued

11. Connect all cables to power distribution panel (Figure 4, Item 1).
12. Connect negative terminal to battery (see WP 0056). Flatten Genset in accordance with Genset Flatten Procedure (WP 0005) of this TM.

Table 4. J2 and J3 Connections.

CONNECTOR	CONNECTIONS		
	N	L	G
J2 120 VOLTS 20 AMP	108-CF4-3	145-CF4-10	114-CF4-6
J3 120 VOLTS 20 AMP	109-CF4-4	146-CF4-11	115-CF4-7

NOTE

For clarity the door protecting the circuit breakers has been removed.

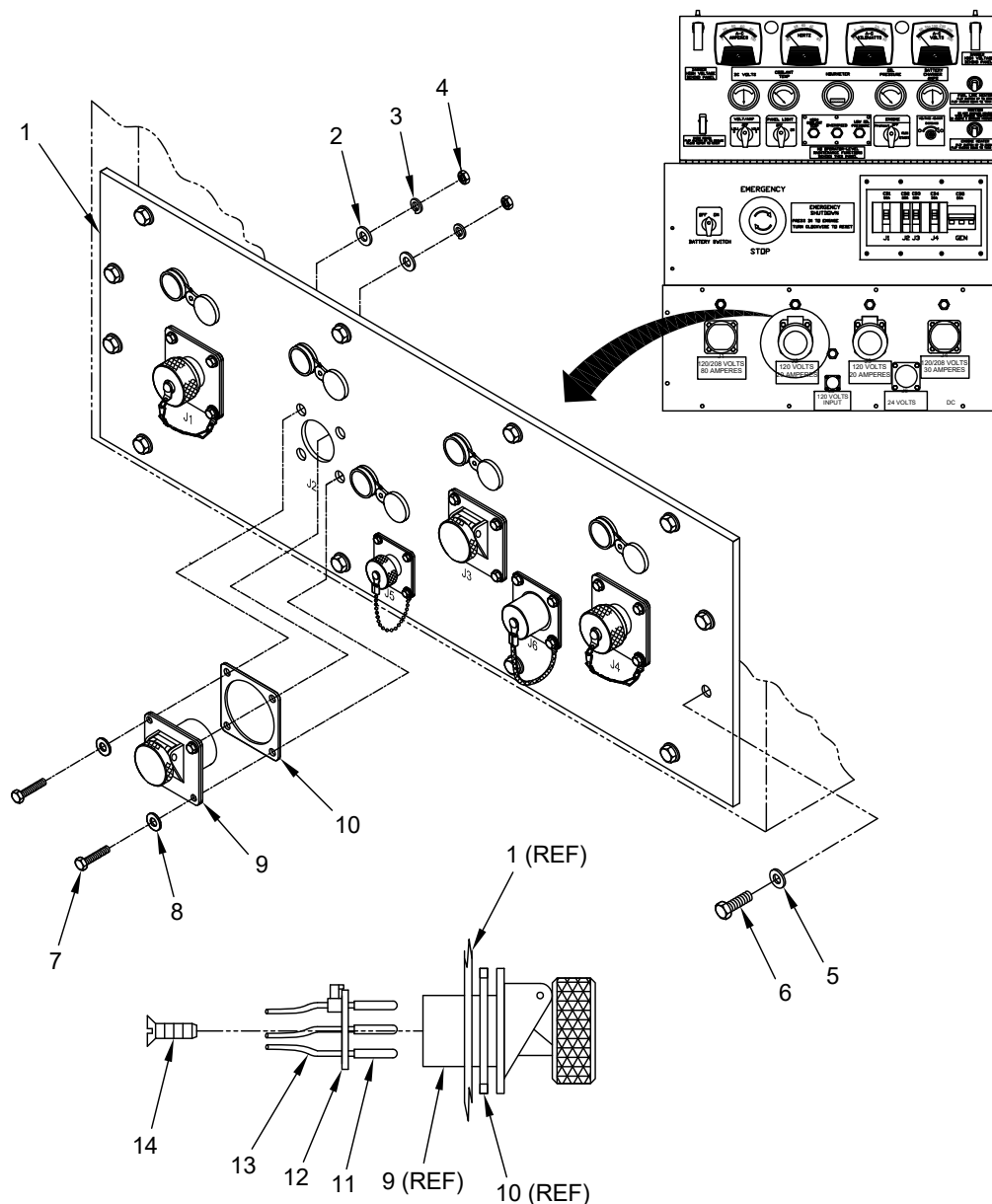


Figure 4. Connector (J2 and J3) Removal/Replacement.

END OF TASK

CONNECTOR (J5) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
12

Reference

WP 0005, WP 0056, FO-6 through FO-

Materials/Parts

Connector
Strap ties (WP 0180, Item 55 to 57)

Equipment Condition

Genset Shut Down
BATTERY SWITCH - OFF

Personnel Required

One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to both the old and new version (J5 connector).

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 5, Item 1).
5. Remove and retain twelve bolts (Figure 5, Item 8) and lock washers (Figure 5, Item 9) that secure power distribution panel (Figure 5, Item 1) to Genset.

NOTE

It may be necessary to remove one latch (Figure 5, Item 2) to remove power distribution panel (Figure 5, Item 1).

6. Remove and retain two screws and bolts (not shown) from one side of hinge (Figure 5, Item 2) and lift hinge (Figure 5, Item 2) out of the way.
7. Remove power distribution panel (Figure 5, Item 1) and lay face down.

REMOVAL – Continued

8. Disconnect three terminals (Figure 5, Item 3) from wiring harness (Figure 5, Item 4) and remove strap tie securing wires to power distribution panel (Figure 5, Item 1).
9. Remove and retain four screws (Figure 5, Item 5) that secure connector (Figure 5, Item 6) and dust cover (Figure 5, Item 7) to power distribution panel (Figure 5, Item 1).
10. Remove connector (Figure 5, Item 6) (wires will be attached) from power distribution panel (Figure 5, Item 1).

END OF TASK**REPLACEMENT****NOTE**

If necessary, refer to (Table 5) and (FO-6 through FO-12) for electrical schematics and wiring diagrams.

Refer to (Figure 7) for pin layout of J5.

Inspect backside of power distribution panel (Figure 5, Item 1) for four clinch nuts. Ensure that clinch-nuts are securely fastened to power distribution panel (Figure 5, Item 1).

1. Inspect all wires (Figure 5, Items 3 and 4) for nicks, cuts, burn marks, or other damage. If necessary replace with appropriate gauge and color of wire.
2. Feed wires (Figure 5, Item 3) through power distribution panel (Figure 5, Item 1).
3. Connect wires (Figure 5, Item 3) to terminals on chassis wiring harness (Figure 5, Item 4).
4. Properly orientate connector assembly (Figure 5, Item 6) to power distribution panel (Figure 5, Item 1) and insert.

NOTE

When performing the following step, do not tighten hardware until all hardware has been installed.

5. Secure connector assembly (Figure 5, Item 6) and dust cover (Figure 5, Item 7) to power distribution panel (Figure 5, Item 1) using four screws (Figure 5, Item 5).
6. Secure loose wires (Figure 5, Item 3) and chassis wiring harness (Figure 5, Item 4) to power distribution panel (Figure 5, Item 1) using strap ties.
7. Install one side of hinge (Figure 5, Item 2) and secure using two screws and bolts (not shown).
8. Place power distribution panel (Figure 5, Item 1) onto Genset and secure using 12 bolts (Figure 5, Item 8), and washers (Figure 5, Item 9).

REPLACEMENT – Continued**NOTE**

If latch (Figure 5, Item 2) was removed, reinstall.

9. Connect all cables to power distribution panel (Figure 5, Item 1).
10. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 5. J5 Connections.

CONNECTOR	CONNECTIONS		
	A	B	C
J5 120 VOLTS INPUT	96-CF4-1	119-CF4-9	98-CF4-2

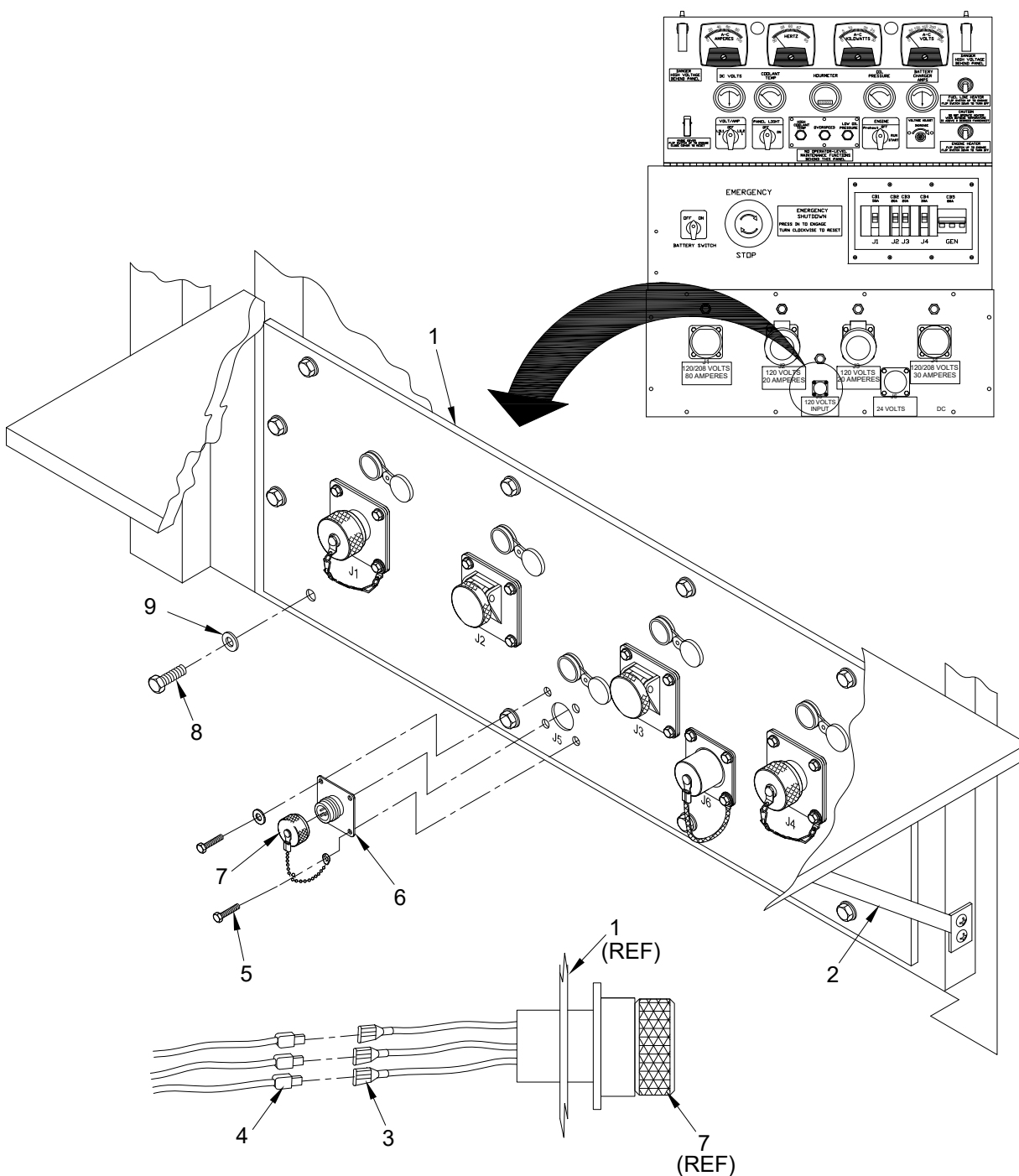


Figure 5. Connector (J5) Removal/Replacement.

END OF TASK

CONNECTOR (J6) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Reference

WP 0005, WP 0056, FO-6 through FO-12

Materials/PartsConnector
Gasket**Equipment Condition**Genset Shut Down
BATTERY SWITCH - OFF**Personnel Required**One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

NOTE

The following procedure is applicable to both the old and new version (J6 connectors).

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. If necessary, raise door and latch in open position.
4. If necessary, disconnect all cables from power distribution panel (Figure 6, Item 1).
5. Remove and retain 12 bolts (Figure 6, Item 13) and lock washers (Figure 6, Item 12) that secure power distribution panel (Figure 6, Item 1) to Genset.
6. Remove and retain two screws and bolts (not shown) from one side of hinge (Figure 5, Item 2) and lift hinge (Figure 5, Item 2) out of the way.
7. Remove power distribution panel (Figure 6, Item 1) and lay face down.
8. Ensure that two terminals (Figure 6, Item 6) are properly identified. Remove and retain two bolts (Figure 6, Item 8), lock washers (Figure 6, Item 7), and terminals (Figure 6, Item 6) from J6 (Figure 6, Item 2).

REMOVAL – Continued

9. Remove and retain four bolts (Figure 6, Item 13), flat washers (Figure 6, Item 14), nuts (Figure 6, Item 5), lock washers (Figure 6, Item 4), and flat washers (Figure 6, Item 3) that secure J6 connector (Figure 6, Items 2 and 12) and dust cover (Figure 6, Item 15) to power distribution panel (Figure 6, Item 1).
10. Remove connector (Figure 6, Items 2 and 12) from power distribution panel (Figure 6, Item 1).

END OF TASK**REPLACEMENT****NOTE**

If necessary, refer to (Table 6) or (FO-6 through FO-12) for electrical schematics and wiring diagrams.

Refer to (Figure 7) for layout of J6.

1. Inspect wires and terminals (Figure 6, Item 6) for nicks, cuts, burn marks, or other damage. If necessary replace.
2. Inspect connector (Figure 6, Items 2 and 12) for damage or excessive wear and tear, if necessary replace.
3. Install connector (Figure 6, Item 2 and 12) onto power distribution panel (Figure 6, Item 1).

NOTE

When performing the following step, do not tighten hardware until all hardware has been installed.

4. Secure connector (Figure 6, Item 12) and dust cover (Figure 6, Item 15) to power distribution panel (Figure 6, Item 1) using four bolts (Figure 6, Item 13), flat washers (Figure 6, Item 14), nuts (Figure 6, Item 5), lock washers (Figure 6, Item 4) and flat washers (Figure 6, Item 3).
5. Connect terminals (Figure 6, Item 6) to connector (Figure 6, Item 2) using two bolts (Figure 6, Item 8) and lock washers (Figure 6, Item 7).
6. Install one side of hinge (Figure 5, Item 2) and secure using two screws and bolts (not shown).
7. Place power distribution panel (Figure 6, Item 1) onto Genset and secure using 12 bolts (Figure 6, Item 10), and washers (Figure 6, Item 9).
8. Connect all cables to power distribution panel (Figure 6, Item 1).
9. Connect negative terminal to battery (see WP 0056). Flatten Genset in accordance with Genset Flatten Procedure (WP 0005) of this TM.

Table 6. J6 Connections.

CONNECTOR	CONNECTIONS	
	1	2
J6 24 VOLTS DC	226-BAT1 (+)	225-BAT1 (-)

NOTE

For clarity the door protecting the circuit breakers has been removed.

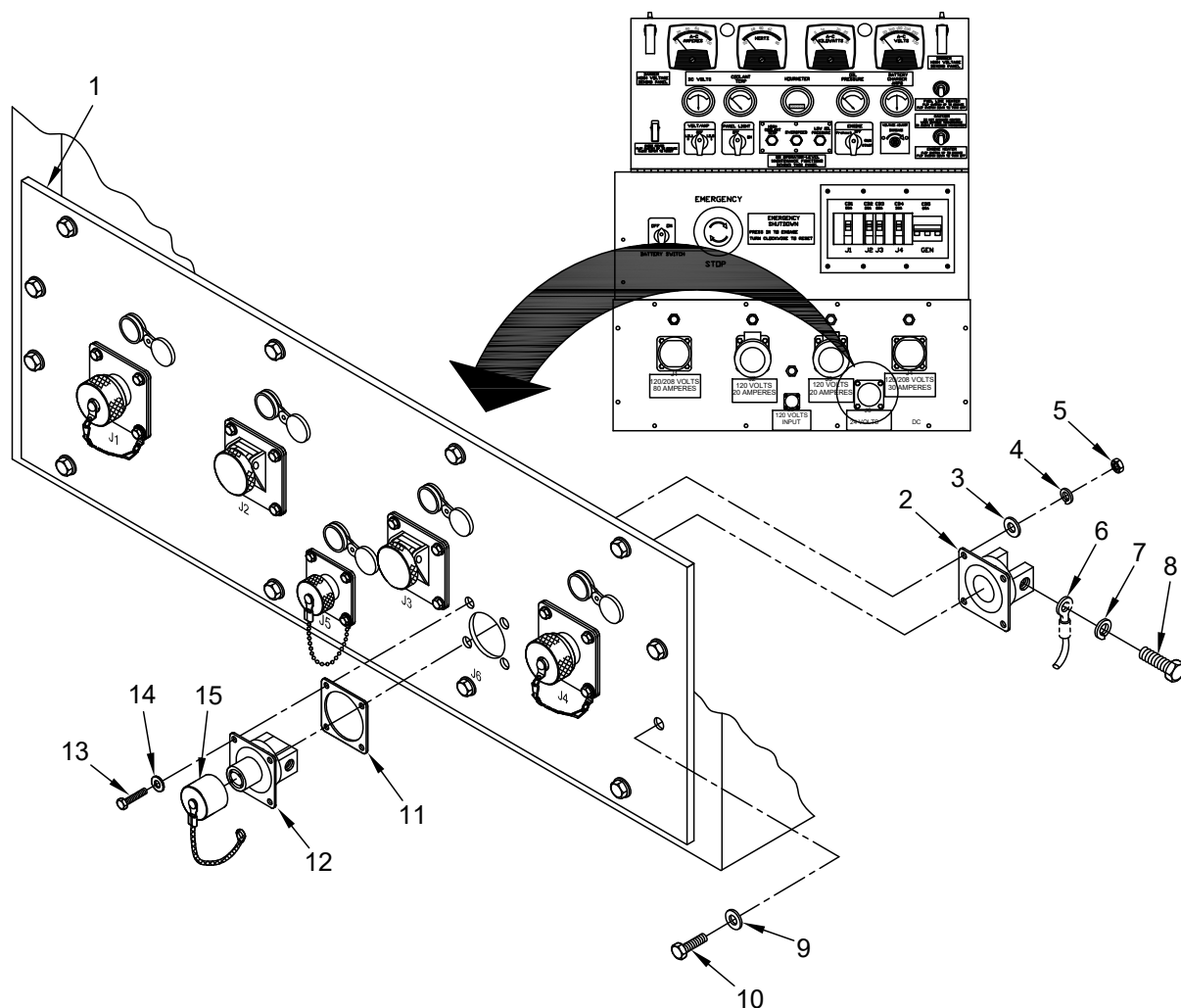


Figure 6. Connector (J6) Removal/Replacement.

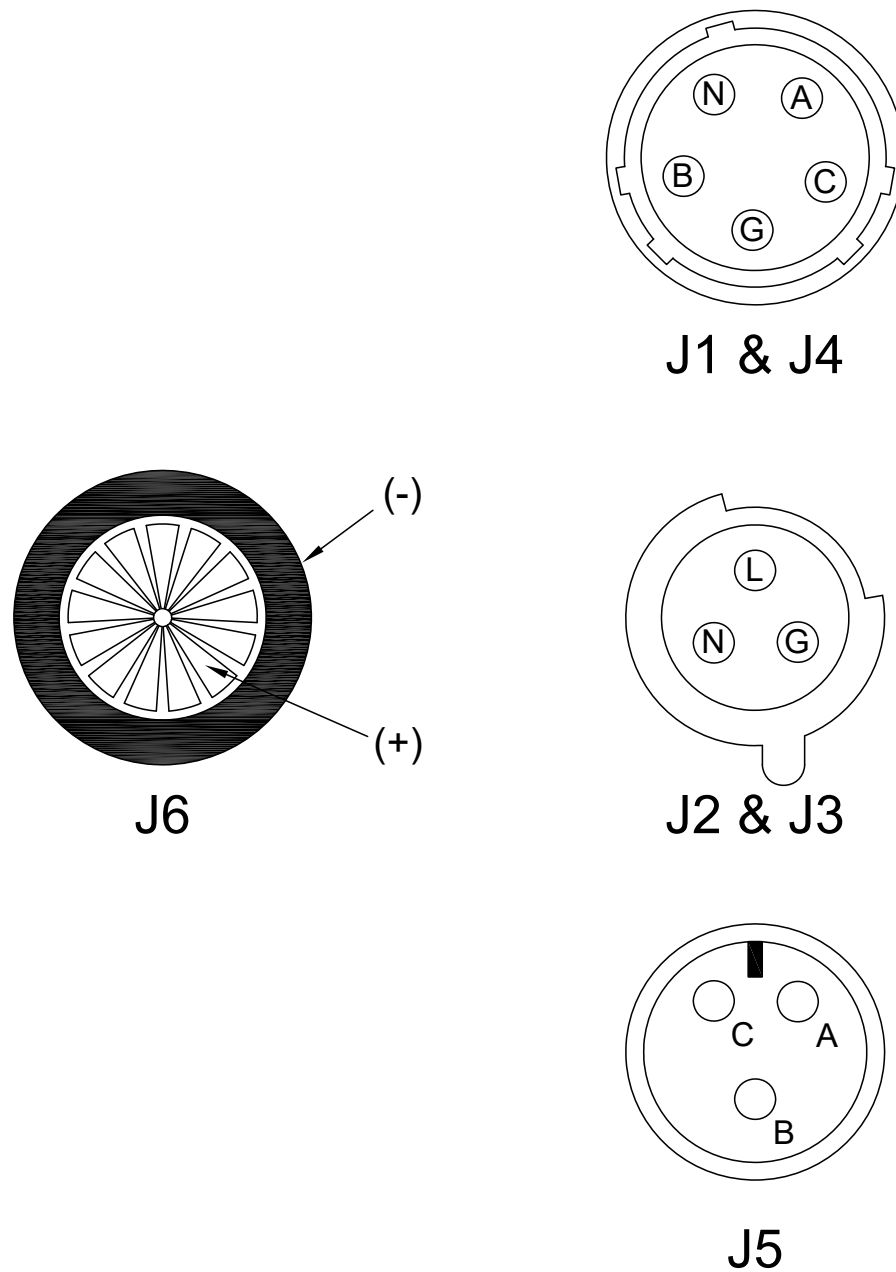


Figure 7. Connector Pin Identification.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL – TRANSDUCER

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Watt Transducer removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

TRANSDUCER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Multimeter (WP 0132, Item 2)

Reference

WP 0005, WP 0056
FO-6 through FO-12

Materials/Parts

Transducer
Strap ties (WP 0180, Item 55 to 57)

Equipment Condition

Genset Shut Down
BATTERY SWITCH - OFF

Personnel Required

One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Loosen but do not remove terminal screws (Figure 1, Item 5) on transducer (Figure 1, Item 1).
5. Mark and disconnect electrical terminals (Figure 1, Item 4) from transducer (Figure 1, Item 1).
6. Remove strap ties securing transducer (Figure 1, Item 1) to mounting strip (Figure 1, Item 2).
7. Release locking tab (Figure 1, Item 3) and remove transducer (Figure 1, Item 1) from mounting strip (Figure 1, Item 2).

END OF TASK

REPLACEMENT**NOTE**

If necessary, refer to (FO-6 through FO-12) for electrical schematic.

Due to excessive weight, transducer may separate from mount if strap ties are not used.

1. Install transducer (Figure 1, Item 1) onto mounting strip (Figure 1, Item 2) and secure locking tab (Figure 1, Item 3).
2. Connect electrical terminals (Figure 1, Item 4) to transducer (Figure 1, Item 1) and tighten terminal screws (Figure 1, Item 5).
3. Secure transducer (Figure 1, Item 1) to mounting strip (Figure 1, Item 2) using strap ties.
4. Close and latch control panel.
5. Connect all cables to power distribution panel (Figure 1, Item 1).
6. Connect negative terminal to battery (see WP 0056). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

NOTE

Terminals #10 and 12 are not present on transducer.

Table 1. Genset Barrier Panel – Transducer Connections.

TRANSDUCER TERMINAL	TERMINAL CONNECTIONS	TRANSDUCER TERMINAL	TERMINAL CONNECTIONS
1	239-TB2-1-1	9	69-CM2-16
2	94-F1-3		
3	67-CM2-14	11	87-PTB2-10
4	240-TB2-2-1		
5	no connection	13	no connection
6	68-CM2-15	14	no connection
7	241-TB2-3-1	15	82-CM2-23
8	95-F3-3	16	81-CM2-22

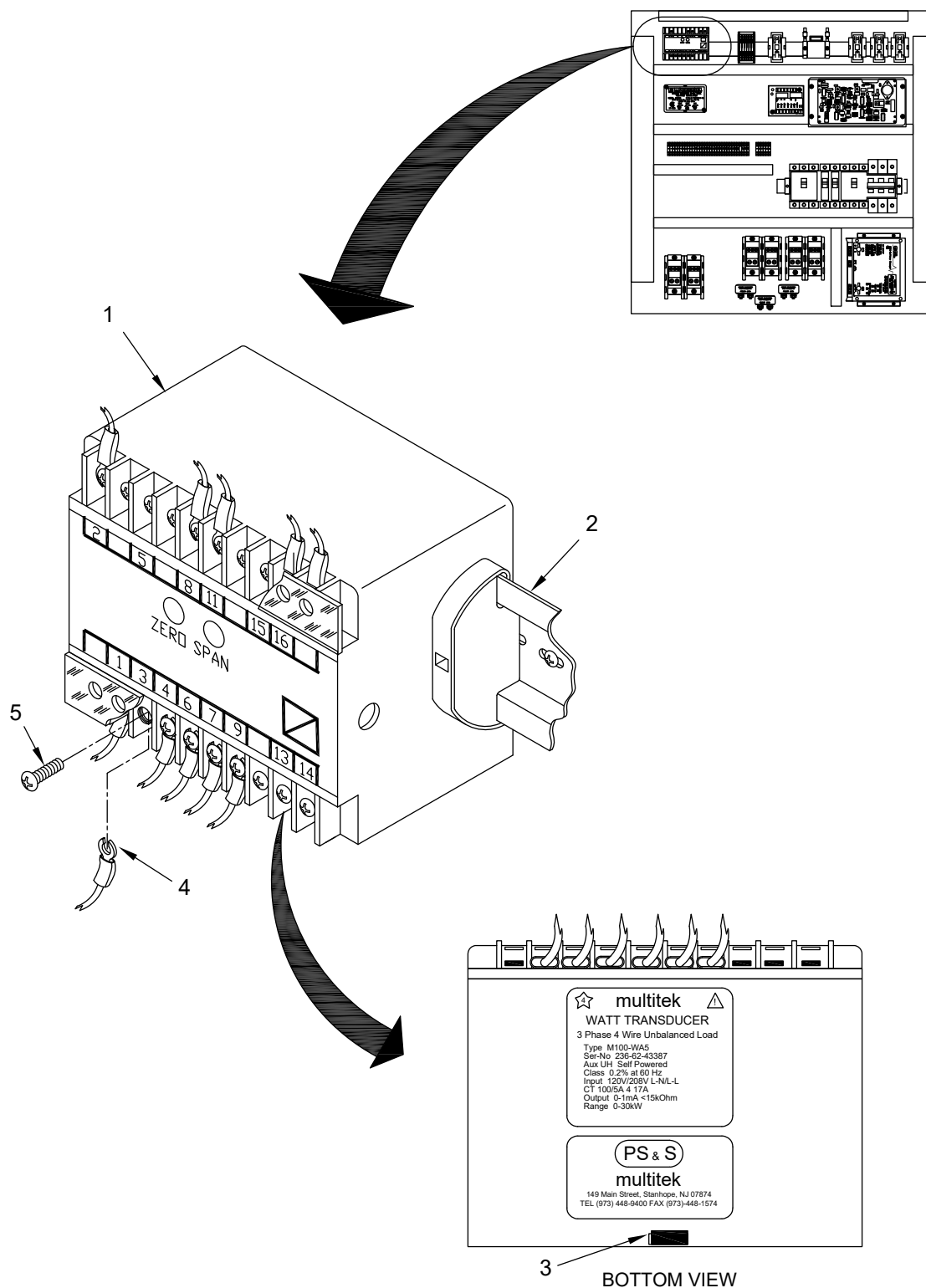


Figure 1. Transducer Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL – CURRENT TRANSFORMER

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Current Transformer removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

CURRENT TRANSFORMER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)
Safety glasses/

Reference

WP 0005, WP 0056, WP 0086,
FO-6 through FO-12

Materials/Parts

Current transformer
Strap ties (WP 0180, Item 55 to 57)

Equipment Condition

Genset Shut Down
BATTERY SWITCH - OFF

Personnel Required

One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Remove power distribution panel as described in (WP 0086), steps 3 through 6.
4. If necessary, remove plastic cover (Figure 1, Item 10) protecting terminal block (Figure 1, Item 1) associated with current transformer (Figure 1, Item 4) being replaced.
5. Loosen but do not remove terminal screw (Figure 1, Item 2) on terminal block (Figure 1, Item 1) associated with current transformer (Figure 1, Item 4) being replaced. Disconnect wire (Figure 1, Item 3) from terminal block (Figure 1, Item 1) and feed through current transformer (Figure 1, Item 4) being replaced.
6. Remove and retain nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7) securing electrical terminals (Figure 1, Item 8) to current transformer (Figure 1, Item 4) being replaced.
7. Mark and disconnect electrical terminals (Figure 1, Item 8) from current transformer (Figure 1, Item 4) being replaced.
8. Remove strap tie securing current transformer (Figure 1, Item 4) to barrier panel (Figure 1, Item 5) and remove current transformer (Figure 1, Item 4).

END OF TASK

REPLACEMENT**NOTE**

If necessary, refer to (FO-6 through FO-12) for electrical schematic.

1. Place current transformer (Figure 1, Item 4) onto barrier panel (Figure 1, Item 5) and secure using strap tie.
2. Feed wire (Figure 1, Item 3) through current transformer (Figure 1, Item 4) and connect to terminal block (Figure 1, Item 1) and tighten terminal screw (Figure 1, Item 2). If applicable, secure plastic cover (Figure 1, Item 10) protecting terminal block (Figure 1, Item 1).
3. Connect electrical terminals (Figure 1, Item 8) to current transformer (Figure 1, Item 4) and secure using nut (Figure 1, Item 6) and lock washer (Figure 1, Item 7).
4. Replace power distribution panel as described in (WP 0086, step 5).
5. Connect all cables to power distribution panel (Figure 1, Item 1).
6. Connect negative terminal to battery (see WP 0056). Start Genset (Figure 1, Item 1) in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Genset Barrier Panel – Current Transformer Connections.

CURRENT TRANSFORMER	TERMINAL CONNECTIONS		FEED THROUGH CONNECTION
	X1-	X2	
CT1	57-TB2-1-2	91-TB2-4-2	111-CB5-1 (black)
CT2	58-TB2-2-3	92-TB2-5-2	112-CB5-3 (red)
CT3	59-TB2-3-2	93-TB2-6-2	113-CB5-5 (blue)

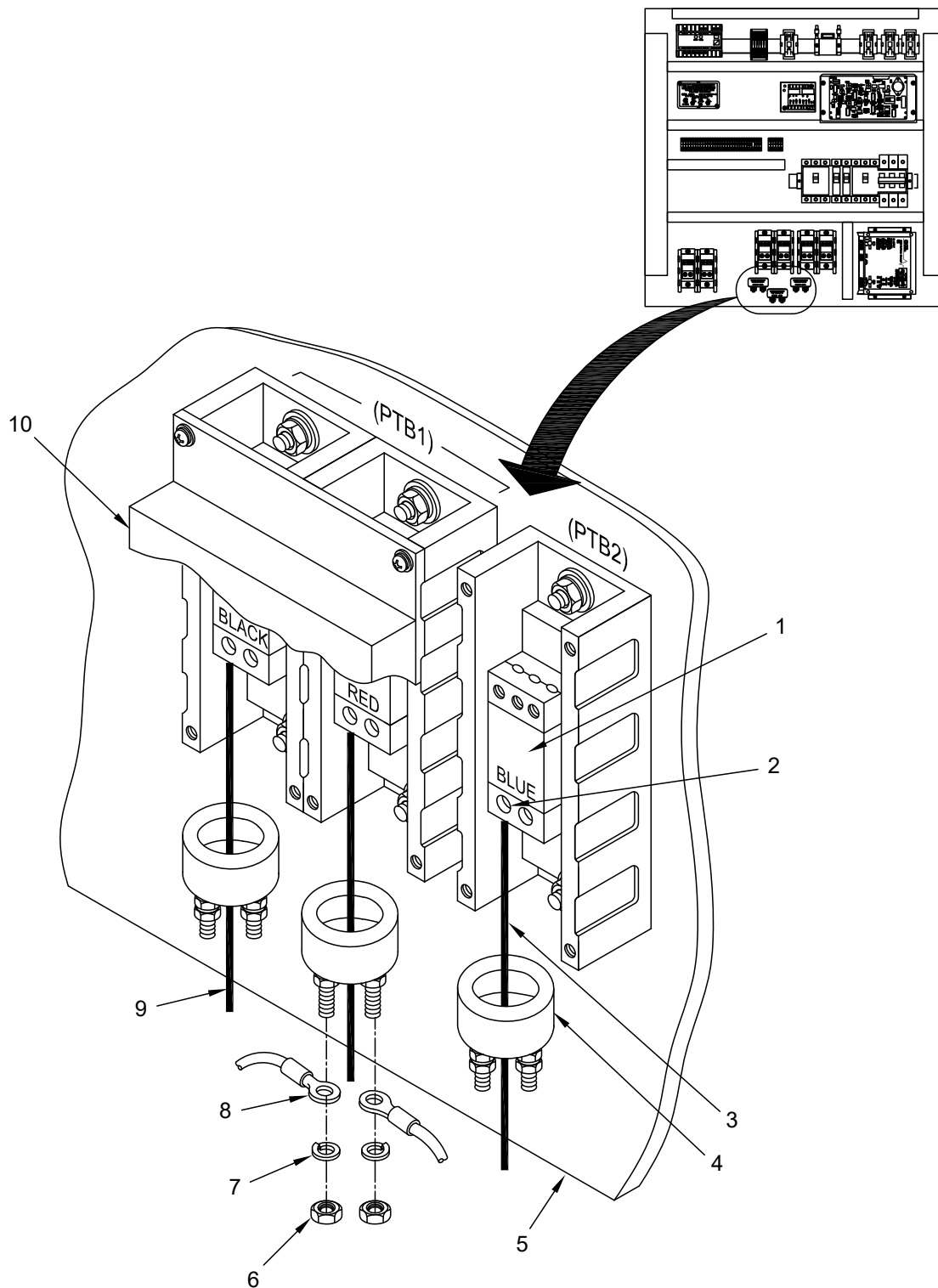


Figure 1. Current Transformer Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL – RELAYS

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Over temperature relay (K4) removal/replacement
- Engine over speed relay (K5) removal/replacement
- Oil pressure low relay (K6) removal/replacement
- Governor controller relay (K7) removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

Relays K4, K5 and K6 operate off 24 VDC and are interchangeable. Relay K7 operates off of 115 VAC.

RELAY (K4, K5, K6, K7) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Reference

WP 0005, WP 0056

Materials/Parts

Current transformer

Strap ties (WP 0180, Item 55 to 57)

Equipment Condition

Genset Shut Down

BATTERY SWITCH - OFF

Personnel RequiredOne

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Remove relay (Figure 1, Item 3) from socket (Figure 1, Item 2) on barrier panel (Figure 1, Item 1) and set aside.

END OF TASK**REPLACEMENT**

1. Properly orientate relay (Figure 1, Item 3) (DC LED at bottom) and insert into socket (Figure 1, Item 2).
2. Close control panel and latch.
3. Connect all cables to power distribution panel (Figure 1, Item 1).
4. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

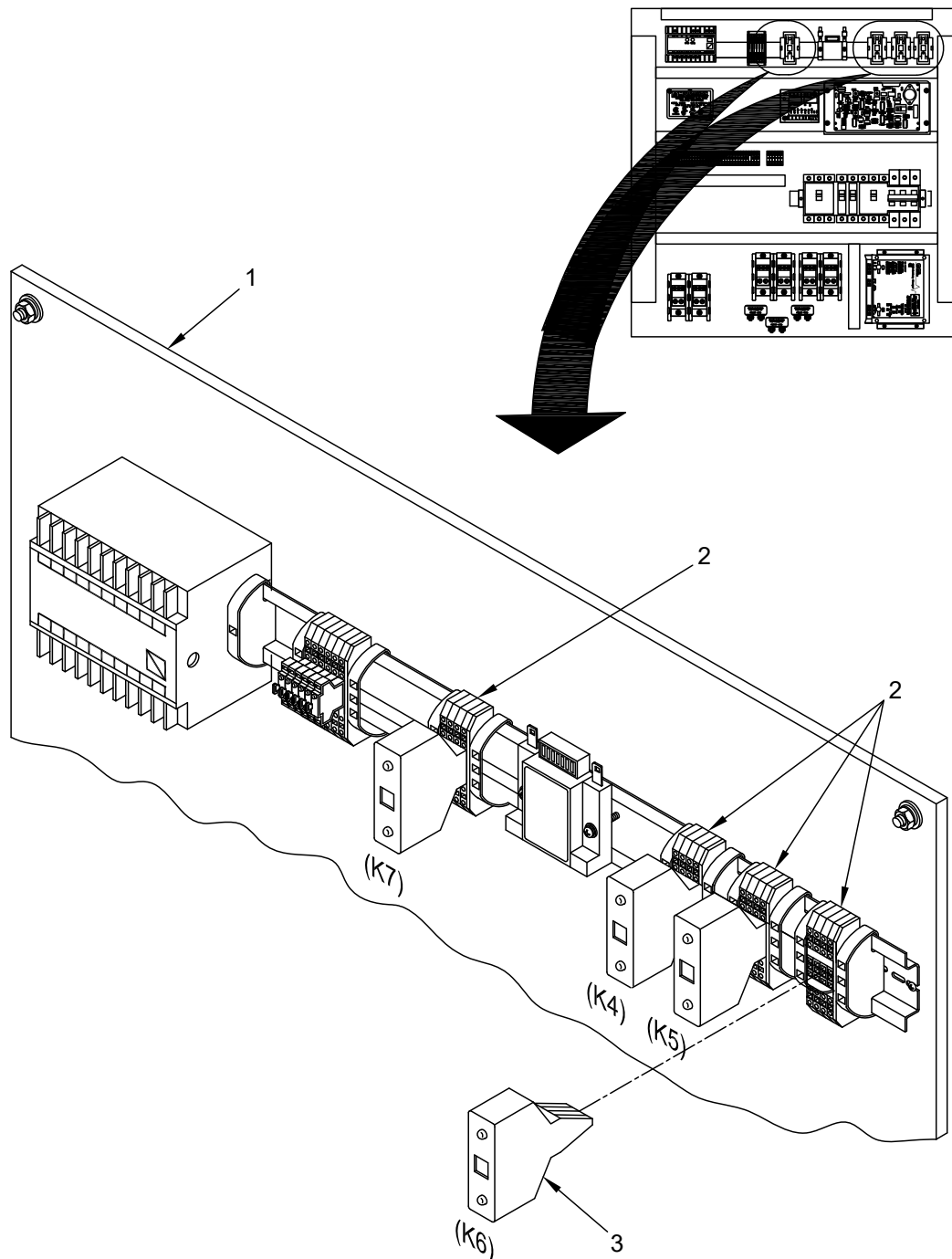


Figure 1. Relay Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL – VOLTAGE REGULATOR

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Voltage regulator removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0043) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

VOLTAGE REGULATOR REMOVAL/REPLACEMENT/ADJUSTMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

ReferenceWP 0005, WP 0043, WP 0056
FO-6 through FO-12**Materials/Parts**

Voltage Regulator

Equipment ConditionGenset Shut Down
BATTERY SWITCH - OFF**Personnel Required**One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Remove and retain two screws (Figure 1, Item 3), lock washers (Figure 1, Item 4) and flat washers (Figure 1, Item 5) securing voltage regulator (Figure 1, Item 2) to stand-offs (Figure 1, Item 7).
5. Remove voltage regulator (Figure 1, Item 2) from stand-offs (Figure 1, Item 7).

NOTE

If voltage regulator has no output, inspect fuse on backside of voltage regulator.
If fuse is bad, replace and check for operational status before replacing.

6. Mark and disconnect terminals (Figure 1, Item 6) from voltage regulator (Figure 1, Item 2) and set voltage regulator (Figure 1, Item 2) aside.

END OF TASK

REPLACEMENT**NOTE**

If necessary, refer to (FO-6 through FO-12) or (Table 1) for electrical schematics and wiring diagrams.

1. Connect terminals (Figure 1, Item 6) to voltage regulator (Figure 1, Item 2) (see Table 1).
2. Place voltage regulator (Figure 1, Item 2) onto stand-offs (Figure 1, Item 7) and secure using two screws (Figure 1, Item 3), lock washers (Figure 1, Item 4) and flat washers (Figure 1, Item 5).
3. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
4. If necessary adjust voltage regulator as described below.
5. Close and latch control panel.
6. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Voltage Regulator Connections.

Voltage Regulator Connections	CONNECTION
60 Hz	no connection
50 Hz	no connection
4	74-F7-3
6	86-CM2-25
7	85-CM2-24
F-	238-TB1-49-1
F+	237-TB1-48-1
3	70-F1-2

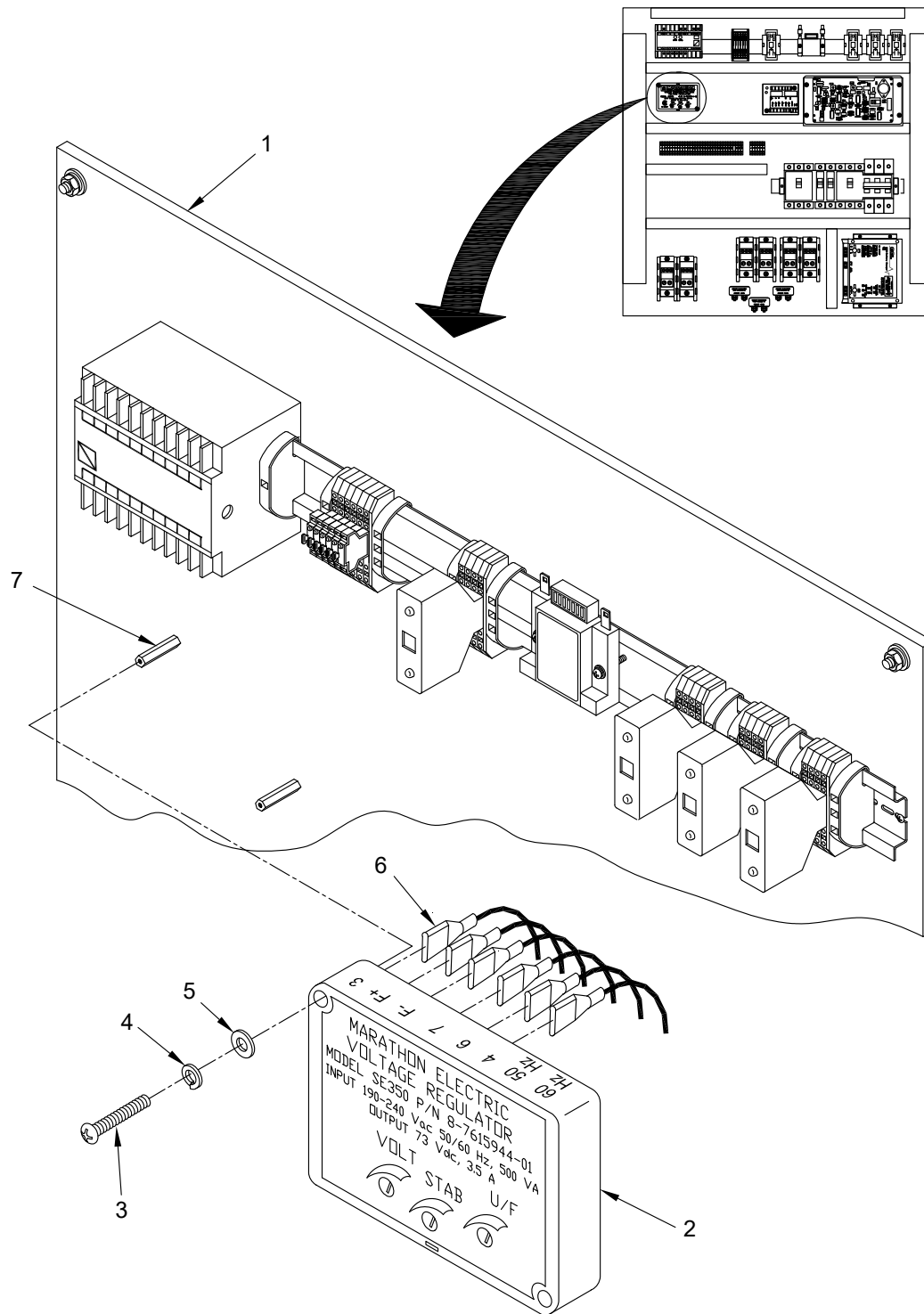


Figure 1. Voltage Regulator Removal/Replacement.

END OF TASK

ADJUSTMENT**Voltage Output**

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
2. Set VOLT/AMP switch to any leg.
3. Check voltage on A-C VOLTS meter.
4. Adjust voltage output using VOLTAGE ADJUST potentiometer on control panel. If voltage cannot be adjusted far enough, perform the following adjustment procedure:
 - a) On control panel:
 1. Center VOLTAGE ADJUST potentiometer on control panel.
 2. Adjust VOLTAGE ADJUST potentiometer on control panel fully clockwise and note position on A-C VOLTS meter.
 3. Adjust VOLTAGE ADJUST potentiometer on control panel fully counter-clockwise and count note position on A-C VOLTS meter.
 4. Adjust VOLTAGE ADJUST potentiometer on control panel clockwise until centered between two noted positions on A-C VOLTS meter.
 5. Check and calibrate A-C VOLTS meter.
 - b) On barrier panel:
 1. Identify voltage regulator on center line of barrier panel on the left.
 2. Identify VOLT adjust set screw on left of voltage-regulator (see Figure 2).
 3. Adjust VOLT set screw while monitoring voltage on multi-meter.
 4. Adjust voltage to exactly 208 volts.
5. Check voltage on A-C VOLTS meter.

END OF TASK**Voltage Stability****NOTE**

System stability is the ability of the generator to respond to load transients. Decreasing the stability makes the generator less sluggish and faster to respond to load transients. If the stability of the regulator is decreased too much, the generator will tend to hunt under steady state condition.

To increase stability, adjust STAB potentiometer (see Figure 2) clockwise. This will increase the response time of the generator.

To decrease stability, adjust STAB potentiometer counter-clockwise. This will decrease the response time of the generator.

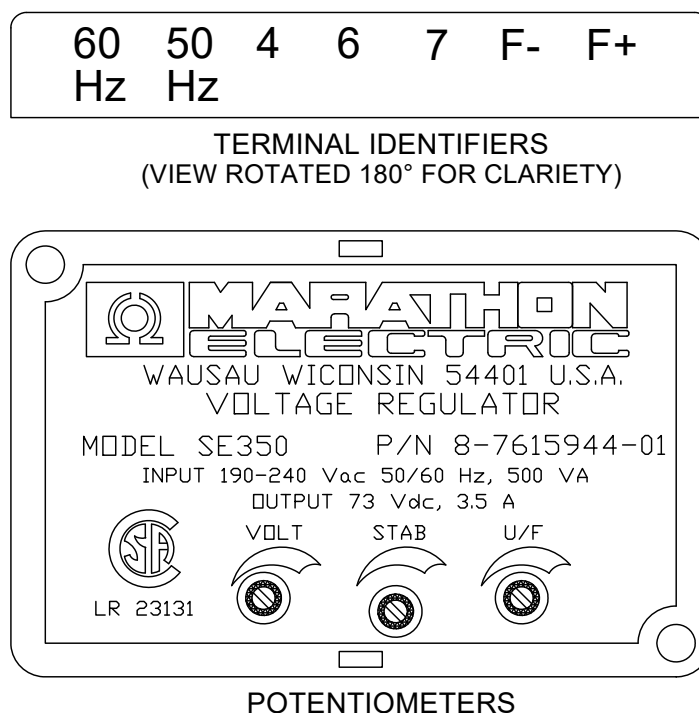
END OF TASK

V/HZ ROLL-OFF FREQUENCY SELECTION**NOTE**

The roll off point is the frequency where the generator voltage starts to decrease. This reduces the Kilowatt load to the engine, which allows the engine to recover in speed under any load transient condition. In 60Hz mode the roll-off frequency has a range of 54-61 Hz.

This voltage regulator has the roll-off point preset to 58Hz in the 60Hz mode.

1. Adjust engine speed to the desired rated speed.
2. Set the voltage to the desired setting at rated speed.
3. Adjust engine speed to the desired roll-off point.
4. Adjust the U/F potentiometer (see Figure 2) counter-clockwise until the voltage starts to drop off.
5. Adjust the U/F potentiometer (see Figure 2) clockwise until the voltage returns to rated voltage.
6. Re-adjust engine speed to rated speed.



VOLT - Voltage
 STAB - Stability
 U/F - Under Frequency

Figure 2. Voltage Regulator Connections and Potentiometer Identification.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL – PRECISION GOVERNOR

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Precision Governor removal/replacement/adjustments

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

PRECISION GOVERNOR REMOVAL/REPLACEMENT/ADJUSTMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

ReferenceWP 0005, WP 0056,
WP 0083, FO-6 through FO-12**Materials/Parts**

Precision governor

Equipment ConditionGenset Shut Down
BATTERY SWITCH - OFF**Personnel Required**One

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Remove and retain four screws (Figure 1, Item 6), lock washers (Figure 1, Item 5), and flat washers (Figure 1, Item 4) securing precision governor (Figure 1, Item 3) to stand-offs (Figure 1, Item 2) on barrier panel (Figure 1, Item 1).
5. Mark and disconnect terminals (Figure 1, Item 7) from precision governor (Figure 1, Item 3).
6. Remove precision governor (Figure 1, Item 3) from barrier panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT**NOTE**

If necessary, refer to (FO-6 through FO-12) or (Table 1) for electrical schematics and wiring diagrams. See (Figure 1) for terminal identification.

1. Connect terminals (Figure 1, Item 7) to precision governor (Figure 1, Item 3).
2. Install precision governor (Figure 1, Item 3) and secure to stand-offs (Figure 1, Item 2) on barrier panel (Figure 1, Item 1) using four screws (Figure 1, Item 6), lock washers (Figure 1, Item 5), and flat washers (Figure 1, Item 4).
3. Close and latch control panel.
4. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Precision Governor Connections.

PRECISION GOVERNOR TERMINALS	CONNECTION
1 + PWR	236-TB1-21-1
2 GND	22-TB1-22-1
3 SIG +	233-TB1-18-1
4 SIG –	234-TB1-19b-1
5 ACT	16-TB1-16-1
6 ACT	17-TB1-17-1
7 AUX 1	no connection
8 AUX 2	no connection

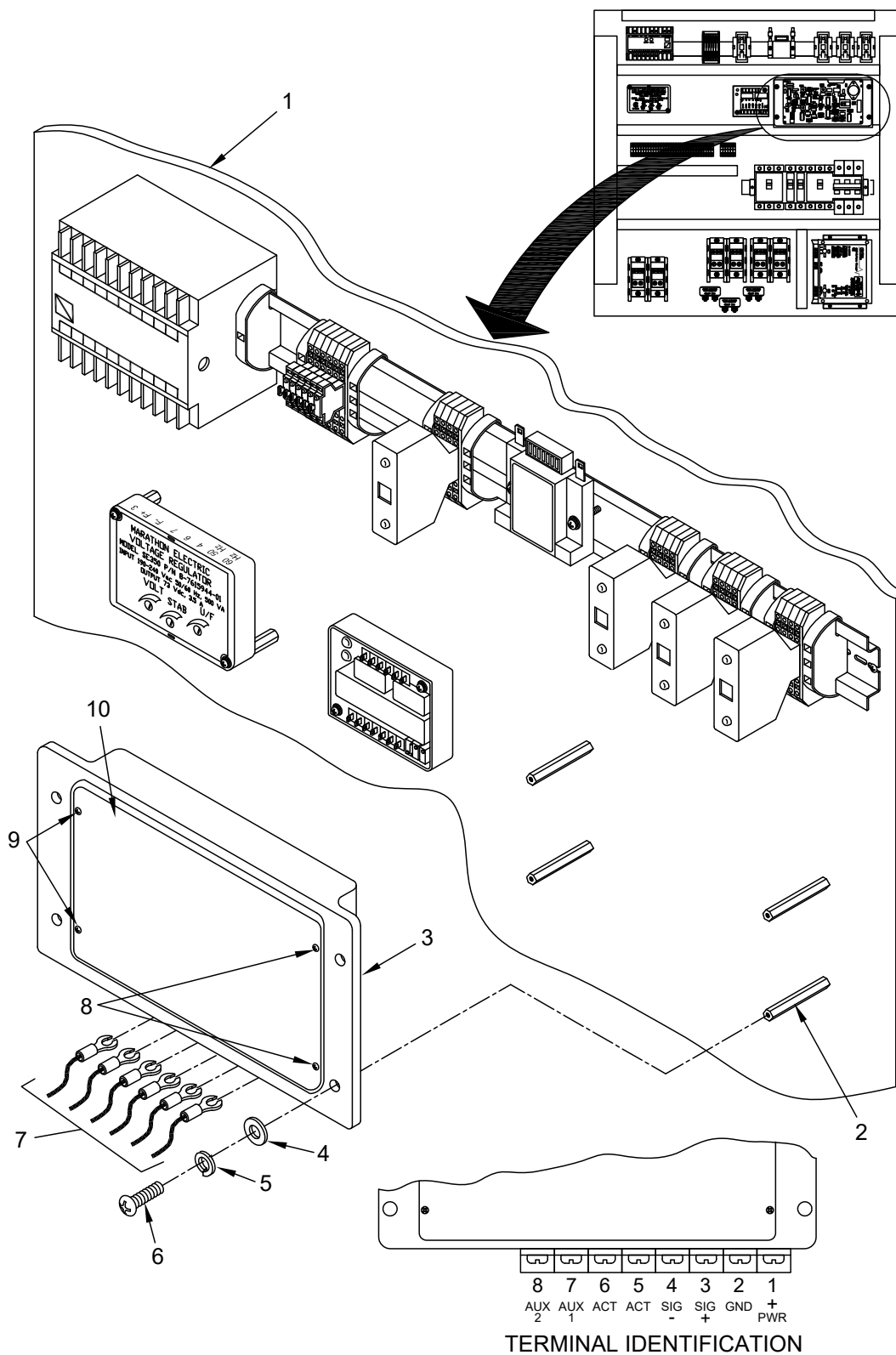


Figure 1. Precision Governor Removal/Replacement.

END OF TASK

ADJUSTMENTS

The following adjustments can cause the main speeds to change; once any changes are made to the derivative, integral and/or gain verify that the main speed is set at its desired setting.

Speed (Frequency) Adjustment (P4) – Controls frequency of the Genset output.

Derivative Adjustment (P6) – Controls how the governor reacts immediately after a load change. Increasing the derivative gain will significantly reduce the engine speed “spike” after a load change

Integral Adjustment (P3) – Controls how quickly the engine completely recovers from large load changes, that is the time period after 1 second from a load change.

Gain Adjustment (P2) – Adjusts the overall response of the governor. When adjusting Gain on a warm engine, it is recommended to adjust the gain so the engine is stable then reduce it slightly. This allows the governor to properly control an engine when it is cold and responds slower.

NOTE

The P1 and P5 pots are not used in this configuration and are not present on the board, the location is shown for reference only.

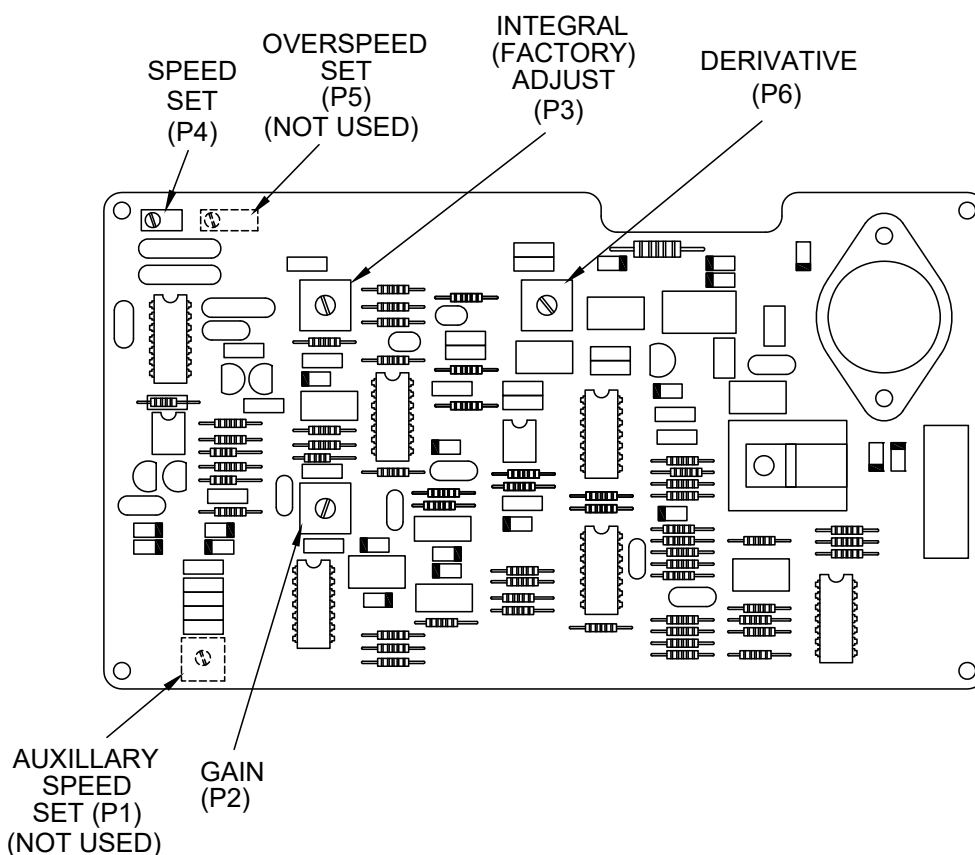


Figure 2. Potentiometer Location and Identification.

SPEED (FREQUENCY) (P4) ADJUST**NOTE**

By adjusting the speed potentiometer clockwise (CW) speed increases.

By adjusting the speed potentiometer counter clockwise (CCW) speed decreases.

The adjustment range of the pot is 25 full turns.

One full turn will change speed about 100 - 200 rpm.

This potentiometer is protected by a slip clutch at each end and will not be harmed by moderate over-adjustment. However, the governor will not function while the pot is past full travel.

If you suspect you may have over-adjusted the Speed Set pot or have lost track of where you are, turn the pot 25-30 turns CCW, then back 10-12 turns CW to get back into the range of normal adjustment.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
2. Check frequency reading on HERTZ meter.
3. Open control panel and allow control panel to drop down and hang from lanyards.
4. Check and calibrate the HERTZ meter (see WP 0083).
5. Remove and retain two screws (Figure 1, Item 8) on right side of access cover (Figure 1, Item 10).
6. Loosen but do not remove two screws (Figure 1, Item 9) on left side of access cover (Figure 1, Item 10).
7. Remove access cover (Figure 1, Item 10) and locate speed set potentiometer (P4) (upper left corner of circuit card (see Figure 2).
8. Adjust the frequency to 60 hertz by adjusting speed set potentiometer (P4) screw while monitoring the frequency on the HERTZ meter.
9. Replace access cover (Figure 1, Item 10), install two screws (Figure 1, Item 8).
10. Tighten four screws (Figure 1, Items 8 and 9).
11. Close and latch control panel.
12. Check HERTZ meter and verify proper operational frequency.

END OF TASK

DERIVATIVE (P6) ADJUST**CAUTION**

The derivative potentiometer (P6) is a single –turn potentiometer. Be gentle, this pot turns 270°, and over-turning will break the internal stops, making adjustment impossible.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
3. Open control panel and allow control panel to drop down and hang from lanyards.
5. Remove and retain two screws (Figure 1, Item 8) on right side of access cover (Figure 1, Item 10).
6. Loosen but do not remove two screws (Figure 1, Item 9) on left side of access cover (Figure 1, Item 10).
7. Remove access cover (Figure 1, Item 10) and locate derivative potentiometer (P6) (upper middle of circuit card. See Figure 2).

NOTE

Turning the derivative potentiometer (P6) CW increases governor sensitivity. Too much derivative will cause a very quick engine surge, possibly up to several strokes a second.

Turning derivative potentiometer (P6) CCW decreases governor sensitivity. Too low of a derivative setting will show up as sluggish response.

8. Adjust derivative potentiometer (P6) screw to desired setting.
9. Replace access cover (Figure 1, Item 10), install two screws (Figure 1, Item 8).
10. Tighten four screws (Figure 1, Items 8 and 9).
11. Close and latch control panel.

END OF TASK

INTEGRAL (P3) ADJUST

The integral adjust potentiometer (P3) is set at the factory and should not be adjusted unless absolutely necessary.

CAUTION

The integral adjust potentiometer (P3) is a single –turn potentiometer. Be gentle, this pot turns 270°, and over-turning will break the internal stops, making adjustment impossible.

NOTE

Increasing the integral gain shortens the time to achieve the desired engine speed.

Too low of an integral adjustment causes the engine to slowly achieve the desired speed.

Excessive integral gain will cause the engine to “over respond” for a second or two before settling at the desired speed. It can also result in a slow wander of the engine speed.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
3. Open control panel and allow control panel to drop down and hang from lanyards.
5. Remove and retain two screws (Figure 1, Item 8) on right side of access cover (Figure 1, Item 10).
6. Loosen but do not remove two screws (Figure 1, Item 9) on left side of access cover (Figure 1, Item 10).
7. Remove access cover (Figure 1, Item 10) and locate integral adjust potentiometer (P3) upper left corner of circuit card (See Figure 2).

NOTE

Turning the integral adjusts potentiometer (P3) CW increases gain.

Turning integral adjust potentiometer (P3) CCW decreases gain.

8. Adjust integral adjust potentiometer (P3) to desired setting.
9. Replace access cover (Figure 1, Item 10); install two screws (Figure 1, Item 8).
10. Tighten four screws (Figure 1, Items 8 and 9).
11. Close and latch control panel.

END OF TASK

GAIN (P2) ADJUST**CAUTION**

The gain adjust potentiometer (P2) is a single –turn potentiometer. Be gentle, this pot turns 270°, and over-turning will break the internal stops, making adjustment impossible.

NOTE

Increasing the gain adjustment will cause the governor to respond quicker.

Setting the gain too high typically causes an engine speed surge that occurs on every ½ to 1 second.

Decreasing this adjustment will cause the governor to respond slower.

Setting the gain too low causes sluggish engine performance.

1. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
3. Open control panel and allow control panel to drop down and hang from lanyards.
5. Remove and retain two screws (Figure 1, Item 8) on right side of access cover (Figure 1, Item 10).
6. Loosen but do not remove two screws (Figure 1, Item 9) on left side of access cover (Figure 1, Item 10).
7. Remove access cover (Figure 1, Item 10) and locate the gain potentiometer (P2) (lower left of circuit card (see Figure 2).

NOTE

Turning the gain potentiometer (P2) CW gain increases.

Turning the gain potentiometer (P2) CCW gain decreases.

8. Adjust the gain potentiometer (P2) to desired setting.
9. Replace access cover (Figure 1, Item 10), install two screws (Figure 1, Item 8).
10. Tighten four screws (Figure 1, Items 8 and 9).
11. Close and latch control panel.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL –TIME DELAY

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Time delay removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

The time delay should be set for a four second delay.

TIME DELAY REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Reference

WP 0005, WP 0056

Materials/Parts

Current transformer

Strap ties (WP 0180, Item 55 to 57)

Equipment Condition

Genset Shut Down

BATTERY SWITCH - OFF

Personnel RequiredOne

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status.

To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.
4. Mark and disconnect two terminals (Figure 1, Item 8) from time delay (Figure 1, Item 3).
5. Remove and retain two screws (Figure 1, Item 4), lock washers (Figure 1, Item 5) and flat washers (Figure 1, Item 6) that secure time delay (Figure 1, Item 3) to barrier panel (Figure 1, Item 1).

END OF TASK**REPLACEMENT**

1. Place time delay (Figure 1, Item 3) onto rail (Figure 1, Item 2) of barrier panel (Figure 1, Item 1).
2. Secure using two screws (Figure 1, Item 4), lock washers (Figure 1, Item 5) and flat washers (Figure 1, Item 6).
3. Verify that DIP switches (Figure 1, Item 7) are set for a four second delay (see Figure 1).
4. Connect two terminals (Figure 1, Item 8) to time delay (Figure 1, Item 3).
5. Close and latch control panel.

REPLACEMENT – Continued

6. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

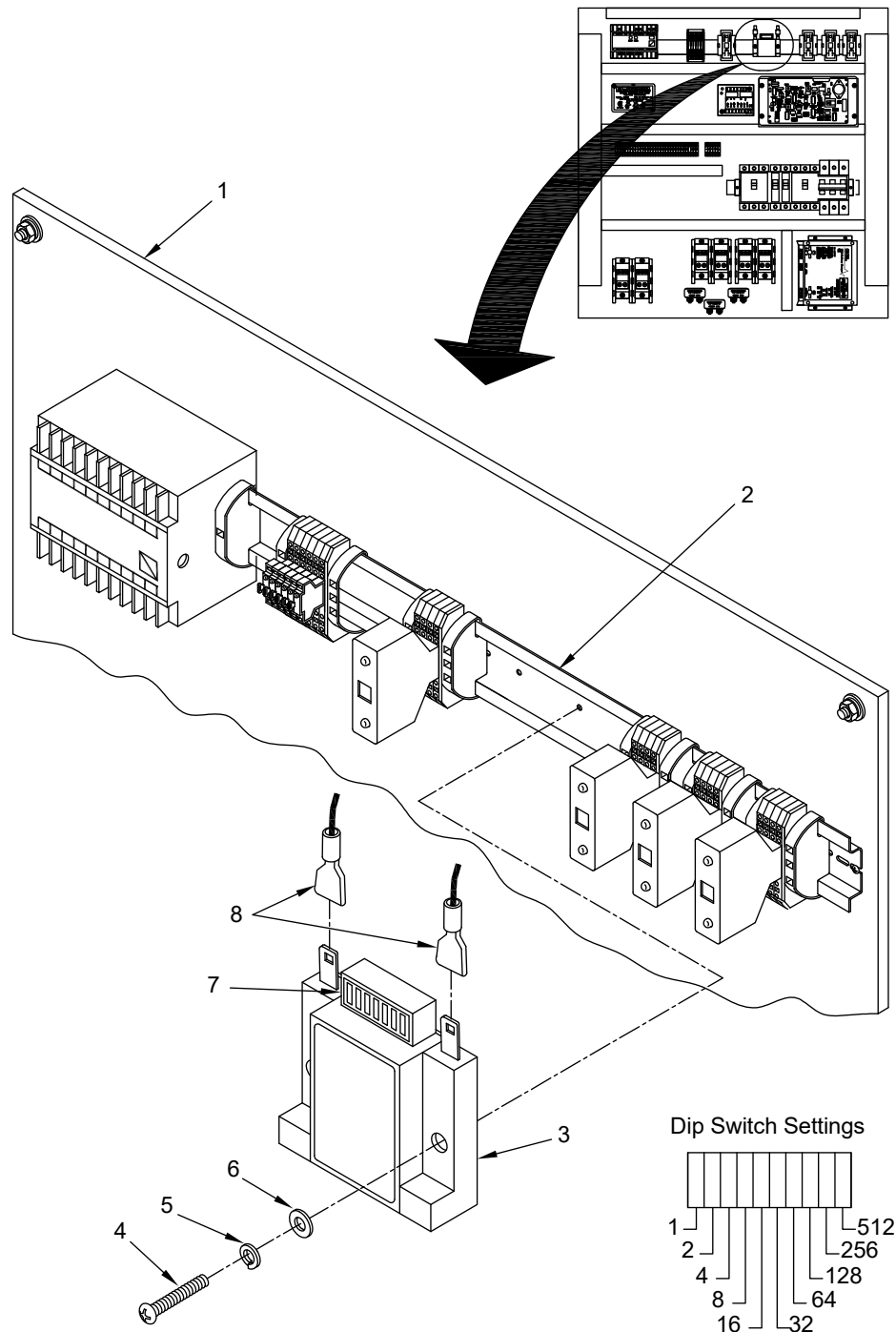


Figure 1. Time Delay Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL – SPEED SENSOR

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. They consist of:

- Speed sensor removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

If Genset has been in operation, fluids and components may be extremely hot. To prevent serious injury to personnel, allow the Genset to cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Genset in an operational status. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal ground when conducting any procedures on the HP-2C/185 UST Trailer Genset.

NOTE

If necessary, refer to (WP 0027) for troubleshooting, (Figures FO-6 through FO-12) for electrical schematics and wiring diagrams.

SPEED SENSOR REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic equipment tool kit (WP 0132, Item 4)

Reference

WP 0005, WP 0056

FO-6 through FO-12

Materials/Parts

Speed Sensor

Equipment Condition

Genset Shut Down

BATTERY SWITCH - OFF

Personnel RequiredOne

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset in an operational status. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect negative terminal from battery (see WP 0056).
3. Open door and control panel, allow control panel to drop down and hang from lanyards.

NOTE

It is not necessary to disconnect jumper wire running from terminal #12 to terminal # 1 of speed sensor.

4. Mark and disconnect terminals (Figure 1, Item 3) from speed sensor (Figure 1, Item 2).
5. Remove one screw (Figure 1, Item 4) and flat washer (Figure 1, Item 5) securing speed sensor (Figure 1, Item 2) to barrier panel (Figure 1, Item 1).
6. Remove two ground terminals (Figure 1, Item 6), second screw (Figure 1, Item 4) and flat washer (Figure 1, Item 5) securing speed sensor (Figure 1, Item 2) to barrier panel (Figure 1, Item 1).
7. Remove speed sensor (Figure 1, Item 2) from barrier panel (Figure 1, Item 1).

END OF TASK

REPLACEMENT**NOTE**

If necessary, refer to (FO-6 through FO-12) or (Table 1) for electrical schematics and wiring diagrams.

1. Place speed sensor (Figure 1, Item 2) onto barrier panel (Figure 1, Item 1) and secure using one screw (Figure 1, Item 4) and flat washer (Figure 1, Item 5).
2. Secure two ground terminals (Figure 1, Item 6) to speed sensor (Figure 1, Item 2) and secure using second screw (Figure 1, Item 4) and flat washer (Figure 1, Item 5).
2. Connect remaining terminals (Figure 1, Item 3) to speed sensor (Figure 1, Item 2).
- 3; Close and latch control panel.
4. Connect negative terminal to battery (see WP 0056). Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

Table 1. Speed Sensor Connections.

SPEED SENSOR TERMINALS	CONNECTION
1	213-SS-12
2	214-SS-G
	242-TB1-2-1
3	18-TB1-18b-1
4	19-TB1-19-1
5	no connection
6	no connection
7	no connection
8	no connection
9	no connection
10	no connection
11	32-K5-6
12	28-K6-8
	213-SS-1
13	no connection
ground	SH-TB1-20-1
	214-SS-2

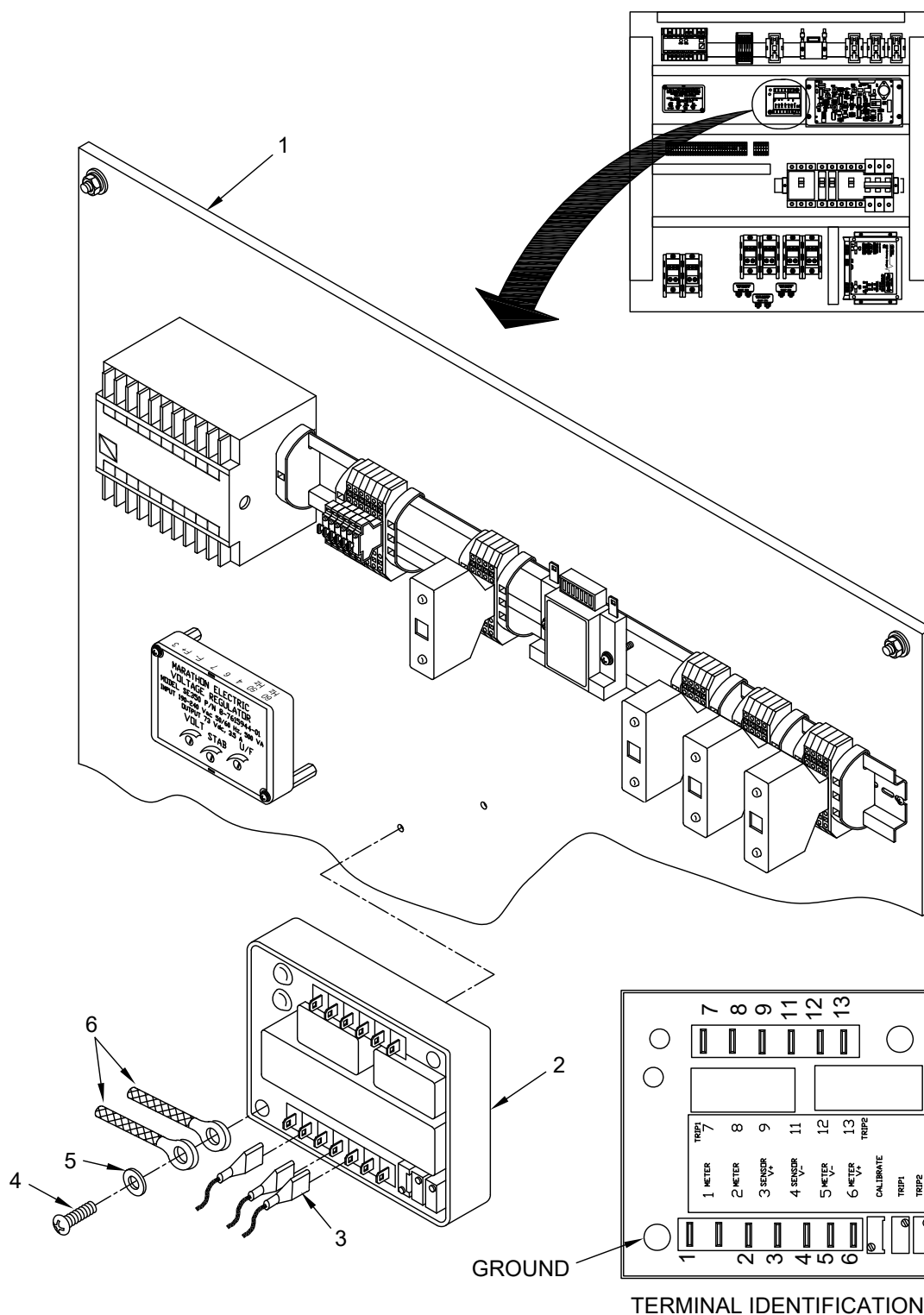


Figure 1. Speed Sensor Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
GENSET BARRIER PANEL - BATTERY CHARGER MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the Genset barrier panel. Consisting of:

- Battery charger removal/replacement
- Battery charger relay (K6) removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

Wear appropriate eye protection when performing maintenance. Metal pieces, fluids, dirt, grease, corrosion and escaping vapors and gasses present. Failure to comply may result in injury to personnel.

Remove rings, bracelets, wrist watches, neck chains, and any other jewelry before working around the Genset. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

CAUTION

Never attempt to connect or disconnect cables with Genset in operation. Always ensure Genset is shut down before attempting to perform any of the following procedures.

Always disconnect battery ground cable (black) from battery ground terminal when conducting any procedures on the Genset.

Never re-use gaskets, seals, "O"-rings, springs, damaged parts or hardware that is deficient. Failure to replace these items could cause leaks or premature malfunction(s) and eventually damage the system.

NOTE

If necessary, refer to:

- WP 0031 for electrical troubleshooting of Genset.
- Fold Out Pages for Genset.

GENSET BARRIER PANEL – BATTERY CHARGER TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, Electronic TK-105 (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Item 2)

Personnel Required

Power Generation Equipment
Repairer, MOS 91D (1)

References

WP 0005, WP 0056, WP 0086

Materials/Parts

Battery charger

Equipment Condition

Genset Shut Down
Battery Switch OFF
Secondary Power Sources
Disconnected

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset is in operation. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

TEST

1. Start Genset in accordance with Genset Start Procedure (WP 0005).
2. Open door and control panel, allow control panel to drop down and hang from lanyards.
3. Using multimeter, measure input voltage across (L) and (N) connectors of battery charger for 110 VAC (95 VAC to 135 VAC is acceptable)
4. Using multimeter, measure output voltage across (+) and (-) (or (+) N/O and (-) N/C) for 27.2 VDC @ 3 amps output.

END OF TASK**REMOVAL**

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect battery ground cable (black) from battery ground terminal. If necessary, refer to procedure in WP 0056.
3. Remove power distribution panel (see WP 0086).

REMOVAL - Continued

4. Mark and disconnect terminals (Figure 1, Item 3) from battery charger (Figure 1, Item 2).
5. Remove and retain four screws (Figure 1, Item 4), lock washers (Figure 1, Item 5), and flat washers (Figure 1, Item 6) securing battery charger (Figure 1, Item 2) to barrier panel (Figure 1, Item 1).
6. Remove battery charger (Figure 1, Item 2).

END OF TASK**REPLACEMENT**

1. Install battery charger (Figure 1, Item 2) and secure to barrier panel (Figure 1, Item 1) using four screws (Figure 1, Item 4), lock washers (Figure 1, Item 5), and flat washers (Figure 1, Item 6).

NOTE

If necessary, refer to Table 1 or Fold Out Pages for Genset.

2. Connect terminals (Figure 1, Item 3) to battery charger (Figure 1, Item 2).
3. Install power distribution panel (see WP 0086).
4. Connect negative terminal to battery (see WP 0056).
5. Start Genset in accordance with Genset Start Procedure (WP 0005).

REPLACEMENT - Continued

Table 1. Battery Charger Connections.

BATTERY CHARGER TERMINALS		CONNECTION
1	COM	no connection
2	N/O (+)	no connection
3	N/C (-)	no connection
4	(+) POS	39-CM2-12
5	(-) NEG	37-TB1-22b-2
6	(\perp) GND	333-GB-3
7	L	97-FB-3
8	N	328-PTB2-10

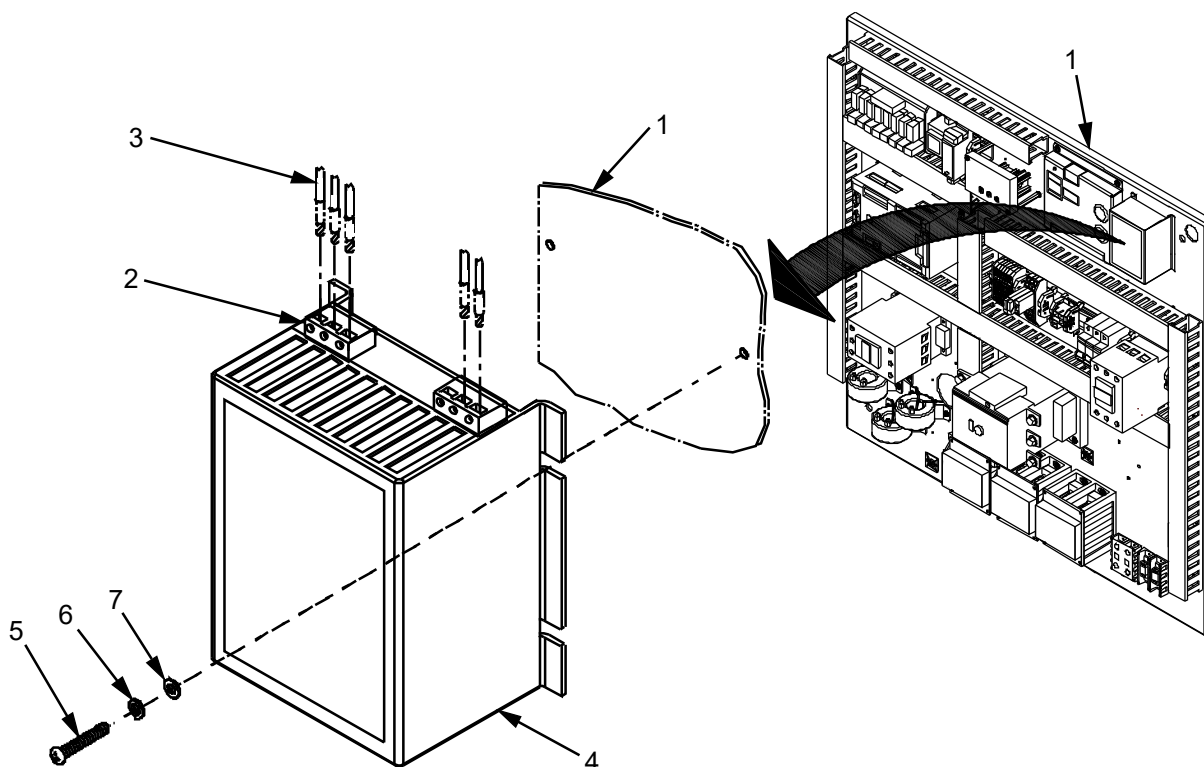


Figure 1. Battery Charger Removal/Replacement.

END OF TASK

GENSET BARRIER PANEL – BATTERY CHARGER RELAY - REPLACE

INITIAL SETUP:**Tools and Special Tools**

Tool Kit, Electronic TK-105 (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Item 2)

Personnel Required

Power Generation Equipment
Repairer, MOS 91D (1)

References

WP 0005, WP 0056

Materials/Parts

Battery charger relay

Equipment Condition

Genset Shut Down
Battery Switch OFF
Secondary Power Sources
Disconnected

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset is in operation. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
3. Remove Instrument Panel and Power Control Panel as described in WP 0060, steps 4 through 12 of this TM.
4. Mark and disconnect terminals (Figure 2, Item 2) from battery charger relay (Figure 1, Item 6).
5. Remove and retain two screws (Figure 2, Item 3), lock washers (Figure 2, Item 4) and flat washers (Figure 2, Item 5) securing battery charger relay (Figure 2, Item 6) to barrier panel (Figure 2, Item 1).
6. Remove battery charger relay (Figure 2, Item 6).

END OF TASK

REPLACEMENT

1. Install battery charger relay (Figure 2, Item 6) and secure to barrier panel (Figure 2, Item 1) using two screws (Figure 2, Item 3), lock washers (Figure 2, Item 4) and flat washers (Figure 2, Item 5).
2. Connect terminals (Figure 2, Item 2) to battery charger relay (Figure 2, Item 6).
3. Replace Instrument Panel and power control Panel as described in WP 0058, steps 4 through 9 of this TM.
4. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
5. Start Genset in accordance with WP 0005, Genset Start Procedure.

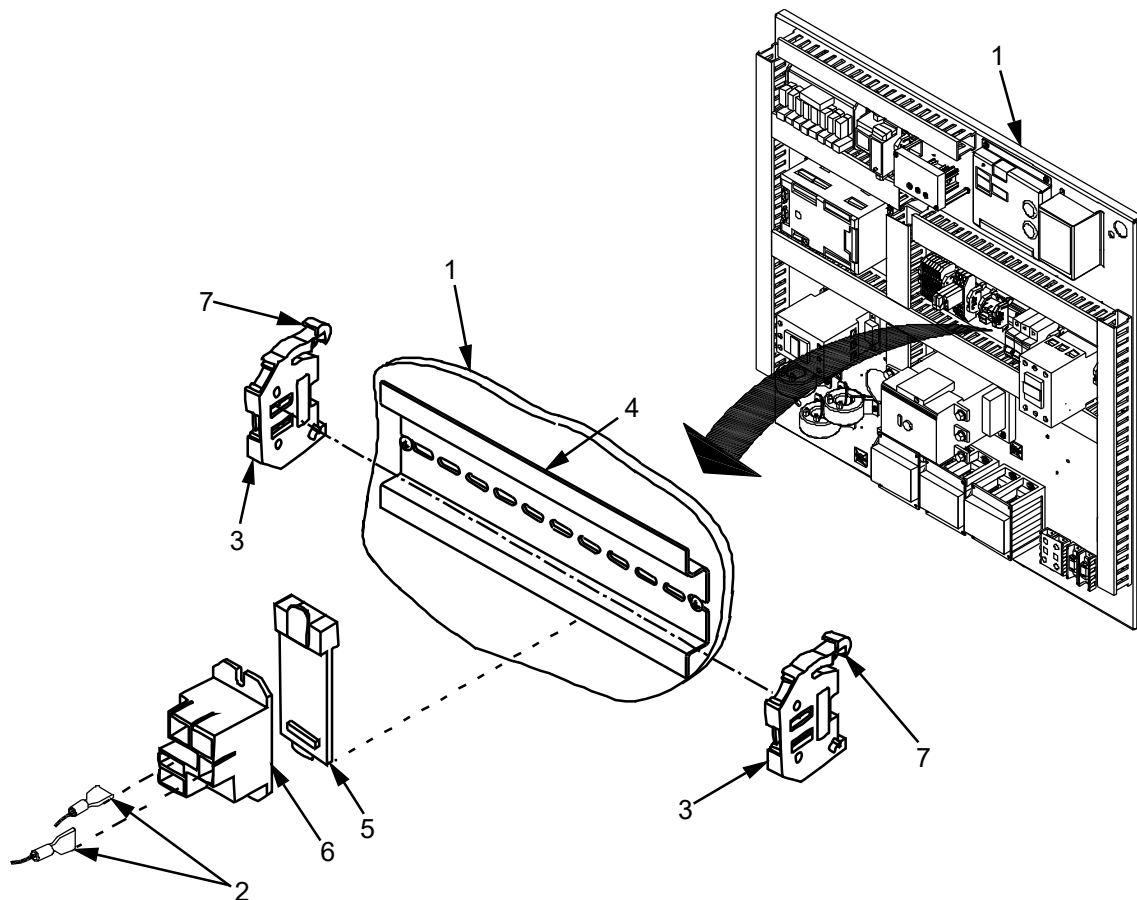


Figure 2. Battery Charger Relay Removal/Replacement.

END OF TASK

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Never attempt to perform maintenance when Genset is in operation. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with Genset operating.

REMOVAL

1. Verify that Genset has been shut down, engine is cool, and that BATTERY SWITCH is set to OFF (WP 0005, Genset Shut Down Procedure).
2. Disconnect battery ground cable (black) (WP 0056, Figure 2, Item 26) from battery.
3. Remove Instrument Panel and Power Control Panel as described in WP 0060, steps 4 through 12 of this TM.
4. Mark and disconnect terminals (Figure 2, Item 2) from battery charger relay (Figure 1, Item 6).
5. Remove and retain two screws (Figure 2, Item 3), lock washers (Figure 2, Item 4) and flat washers (Figure 2, Item 5) securing battery charger relay (Figure 2, Item 6) to barrier panel (Figure 2, Item 1).
6. Remove battery charger relay (Figure 2, Item 6).

END OF TASK

REPLACEMENT

1. Install battery charger relay (Figure 2, Item 6) and secure to barrier panel (Figure 2, Item 1) using two screws (Figure 2, Item 3), lock washers (Figure 2, Item 4) and flat washers (Figure 2, Item 5).
2. Connect terminals (Figure 2, Item 2) to battery charger relay (Figure 2, Item 6).
3. Replace Instrument Panel and power control Panel as described in WP 0060, steps 4 through 9 of this TM.
4. Connect battery ground cable (black) (WP 0056, Figure 2, Item 26) to battery.
5. Start Genset in accordance with WP 0005, Genset Start Procedure.

END OF WORK PACKAGE

CHAPTER 7

MAINTAINER MAINTENANCE INSTRUCTIONS

FOR

HP-2C/185 UST TRAILER

5 TON ECU

**MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
PMCS INTRODUCTION - ECU**

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0180, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

None Required

References

WP 0020, WP 0097

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected from
Power Source

GENERAL

This work package provides data necessary to keep the Environmental Control Unit (ECU) operational ready. PMCS are performed to keep the ECU in operational condition. The checks are used to find, correct, and report problems. Maintenance personnel are required to perform the tasks as indicated in Maintainer PMCS (WP 0097), Table 1. Crew PMCS (WP 0020) are performed by crewmembers each time the equipment is operated.

WARNINGS AND CAUTIONS

Special attention should be paid to the WARNINGS and CAUTIONS appearing in the Maintainer PMCS table. A WARNING means someone could be injured. A CAUTION means equipment could be damaged.

EXPLANATION OF TABLE ENTRIES

Item Number - Numbers in this column are for reference. When completing DA Form 2404/DA Form 5988E (Equipment Inspection and Maintenance Worksheet), include the item number for the check/Maintainer indicating a fault. Item numbers appear in the order in which the checks/Maintainers are performed for the interval listed.

Interval - This column indicates when a procedure must be performed.

- Before you begin operating the Environmental Control Unit, do Before PMCS.
- Once a week do Weekly PMCS. If the Environmental Control Unit has not been operated in a week, perform Before PMCS.
- Do Monthly PMCS once a month. If the Environmental Control Unit has not been operated in a month, perform Weekly, 50 Hour, and 125 Hour PMCS.
- If you are operating the Environmental Control Unit for the first time, perform Weekly PMCS the first time you do your Before PMCS.

If you find something wrong when performing PMCS, fix it if you can. Otherwise, notify next level maintenance.

Item to Be Checked or Serviced - This column provides the item that is to be checked or serviced.

Procedure - This column describes the procedure that must be followed to ensure that the equipment is capable of performing its intended mission.

Equipment Not Ready/Available If - This column lists conditions that make the ECU not fully mission capable. If the problem can be fixed using the troubleshooting procedures and/or maintenance procedures in this manual, do so. If not, document the items not able to be fixed on DA Form 2404 for the next level of maintenance. For further information on how to use this form, see DA PAM 750-8. Be sure to observe and annotate all special circumstances that appear/occur.

NOTE

If the equipment must be kept in continuous operation, only perform those procedures that will not disturb operation. Complete checks and services when the equipment is shut down,

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
MAINTAINER PMCS - ECU

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

None Required

References

WP 0099 through WP 0119

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected from
Power Source

Table 1. Maintainer Preventive Maintenance Checks and Services - ECU.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
	Weekly		<p style="text-align: center;">NOTE</p> <p>Refer to WP 0099 through WP 00119 for ECU maintenance procedures.</p> <ol style="list-style-type: none"> 1. Check damper assembly and sliding door. Verify that mechanism is operating properly. Repair or replace as necessary. 2. Check all components (i.e., switches, knobs, meter, lights, thermostat) for damage. Replace bulbs if necessary. 3. Check condenser grill for damage. Replace if necessary. 	
	50 Hours		<p>Check blower motor fan belt. Check for excessive wear and proper tension. Replace if necessary.</p>	Damaged components, bulbs burnt out.

Table 1. Maintainer Preventive Maintenance Checks and Services – ECU Continued.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
	125 Hours		1. Check air filters, verify that filters are clean and free of excessive dirt, grease and grime. Clean or replace if necessary.	
	125 Hours - continued		2. Check fuel filter, verify that filter is clean and free of excessive dirt and debris. Replace if necessary.	
	500 Hours		Perform overall inspection of ECU.	
			1. Check all components for damage.	Missing or damaged components causing unsafe or improper operation of system.
			2. Check for completeness.	
	2,000 Hours		1. Replace Evaporator motor fan belt (WP 00111).	
			2. Change ECU Auxiliary Heater coolant (WP 0110).	

END OF WORK PACKAGE

**MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
ECU MAINTAINER MAINTENANCE INDEX**

GENERAL

This section contains an index of repair/removal/replacement or maintenance procedures that may be needed during maintenance or repair of the ECU by Maintainer personnel. Maintenance is limited to those failures that may be repaired at the Maintainer level. The index identifies the maintenance function, which is followed by a column that identifies the work package and page(s) where Maintainer level procedure(s) may be found. The index is provided to assist in the quick location of a procedure. The manual cannot list all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

WARNING

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

CAUTION

Never attempt to connect or disconnect cables with Power Source in an operational status. Always ensure Power Source is de-energized before attempting to perform any procedures.

If the ECU suddenly loses power, ensure all switches are reset before applying alternate power. Sudden surges of power could cause damage to components.

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END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU ENCLOSURE MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the following items:

- Access panel latch removal/replacement
- Duct cover removal/replacement
- Fresh air intake door removal/replacement
- Evaporator panel assembly removal/replacement
- Damper assembly removal/replacement
- ECU power and communications cable removal/replacement

This work package also provides information on the cleaning, removal and replacement of the ECU condenser grill. They consist of:

- Condenser coil cleaning.
- Condenser grill removal/replacement.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the ECU.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Prior to performing any maintenance that requires climbing on or under equipment, ensure trailer handbrakes are engaged and wheels are chocked. Injury to personnel could result from the equipment suddenly rolling or tipping.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

ECU ACCESS PANEL LATCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

Latch, clamping

References

WP 0005

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

The following procedure is typical for all latches on the ECU and its access panels.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).

NOTE

When attempting to perform the following step, if panel will not become unlatched, DO NOT force the access panel

2. Remove the ECU access panel (Figure 1, Item 6) with the broken latch.
3. Remove and retain screw (Figure 1, Item 5) and back plate (Figure 1, Item 4) from rear of the latch (Figure 1, Item 1).
4. Remove latch (Figure 1, Item 1) from access panel (Figure 1, Item 6).

END OF TASK**REPLACEMENT**

1. Insert new latch (Figure 1, Item 1) into access panel (Figure 1, Item 6).
2. Secure latch (Figure 1, Item 1) to access panel (Figure 1, Item 6) using screw (Figure 1, Item 5) and back plate (Figure 1, Item 4).
3. If necessary, adjust screw (Figure 1, Item 2) and stop nut (Figure 1, Item 3) to proper level so latch (Figure 1, Item 1) operates properly.

REPLACEMENT – Continued

4. Reattach the repaired ECU access panel (Figure 1, Item 6).
5. Verify that ECU power cable is connected to J4 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005).

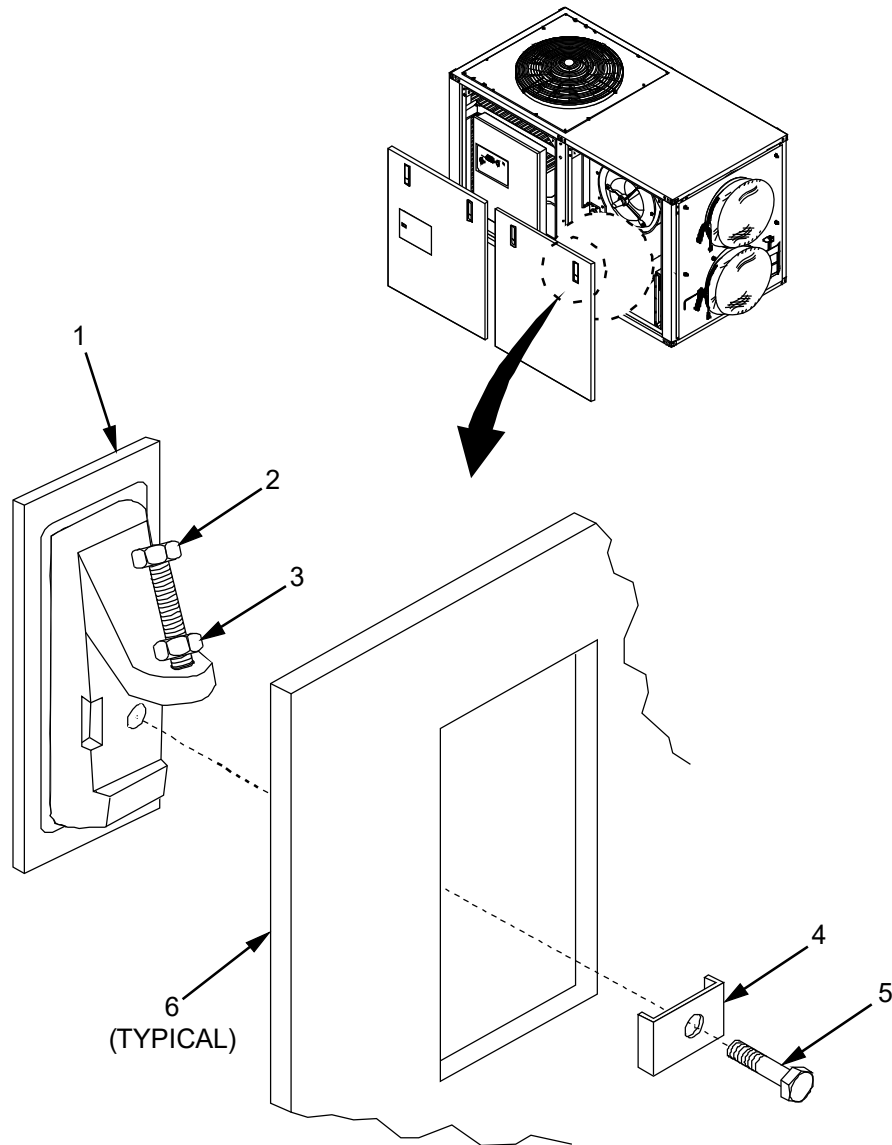


Figure 1. ECU Access Panel Latch Replace.

END OF TASK

ECU DUCT COVER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

Duct cover

References

WP 0005

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. If necessary, remove supply and/or return duct hose from shelter to ECU.
3. Remove screw (Figure 2, Item 2) and washer (Figure 2, Item 3) that secures lanyard (Figure 2, Item 4) of duct cover (Figure 2, Item 1) to the ECU evaporator assembly panel (Figure 2, Item 5)
4. If the duct cover (Figure 2, Item 1) is unserviceable, discard and replace.

END OF TASK**REPLACEMENT**

1. Slide the lanyard (Figure 2, Item 4) through hole in duct storage cover (Figure 2, Item 1).
2. Bend the nylon mounting strap over and insert male locking clasp into female locking clasp.
3. Press clasps together until locked.
4. Attach washer (Figure 2, Item 3) to mount screw (Figure 2, Item 2) and insert through loop in end of the lanyard (Figure 2, Item 4).

REPLACEMENT - Continued

5. Insert screw (Figure 2, Item 2) into hole in ECU evaporator assembly panel (Figure 2, Item 5) and tighten down.
6. If necessary, reconnect supply and/or return duct hose from shelter to ECU.
7. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

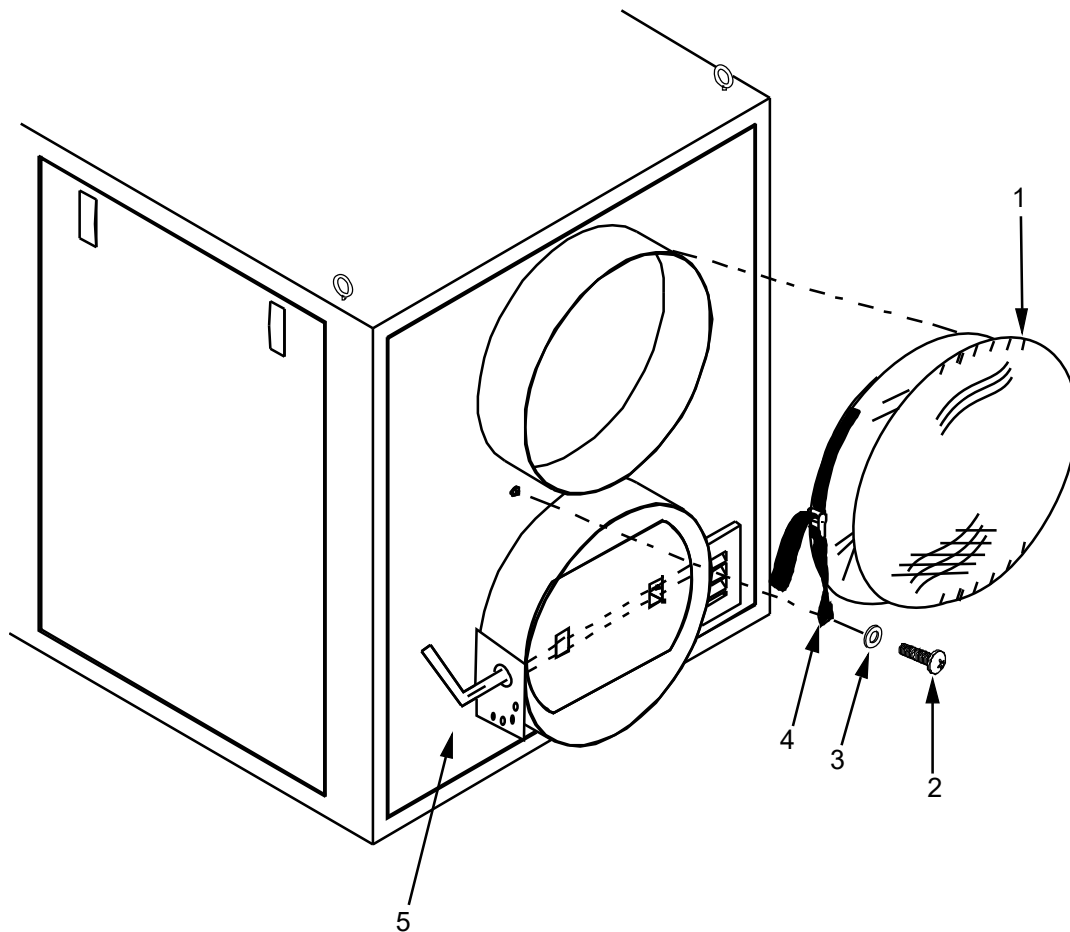


Figure 2. ECU Duct Cover Replace.

END OF TASK

ECU FRESH AIR INTAKE GATE REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

Door, sliding

References

WP 0005

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Remove fresh air intake door (Figure 3, Item 1) by turning knob (Figure 3, Item 2) counter clockwise until loose.
3. Remove and retain knob (Figure 3, Item 2).
4. Remove fresh air intake door (Figure 3, Item 1) out of housing (Figure 3, Item 3).

END OF TASK**REPLACEMENT**

1. Insert fresh air intake door (Figure 3, Item 1) down into the housing (Figure 3, Item 3).
2. Insert knob (Figure 3, Item 2) and turn clockwise to tighten.
3. Adjust the fresh air intake level by loosening knob (Figure 3, Item 2) and sliding fresh air intake gate (Figure 2, Item 1) to desired position. Tighten knob (Figure 3, Item 2).
4. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

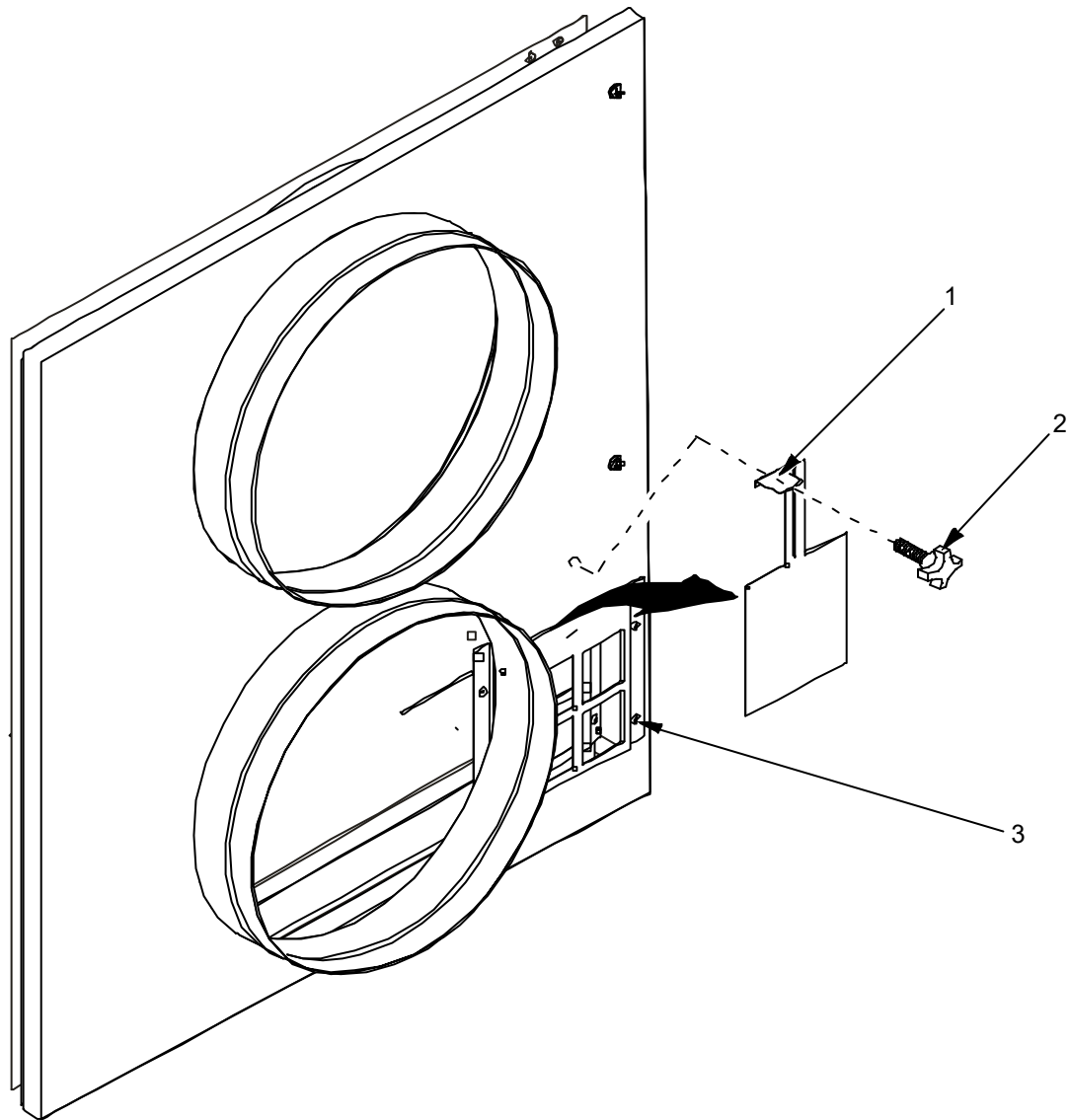


Figure 3. ECU Fresh Air Intake Gate Replace.

END OF TASK

ECU EVAPORATOR PANEL ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

Evaporator panel

References

WP 0005

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Disconnect the ECU power cable (Figure 4, Item 1) from Power Source.
3. Remove supply and/or return duct hose from shelter to ECU and set aside.
4. Remove fresh air intake door (Figure 4, Item 5) from evaporator panel assembly (Figure 4, Item 4) (see procedure in this WP).
5. Remove and retain six screws (Figure 4, Item 3) and washers (Figure 4, Item 2) that secure evaporator panel assembly (Figure 4, Item 4) to ECU.
6. Lift evaporator panel assembly (Figure 4, Item 4) up about one inch until the guide pins clear the center holes.
7. Place evaporator panel assembly (Figure 4, Item 4) out of immediate work area.

END OF TASK

REPLACEMENT

1. Lift evaporator panel assembly (Figure 4, Item 4) into position above the ECU enclosure opening.
2. Lower evaporator panel assembly (Figure 4, Item 4) so that the two guide pins drop into guide pin holes.
3. Push evaporator panel assembly (Figure 4, Item 4) forward until it is firmly against the ECU enclosure.
4. Secure evaporator panel assembly (Figure 4, Item 4) to ECU using six screws (Figure 4, Item 3) and washers (Figure 4, Item 2).
5. Install fresh air intake door (Figure 4, Item 5) and secure to evaporator panel assembly (Figure 4, Item 4) (see procedure in this WP).
6. Install supply and/or return duct hose from shelter to ECU or duct cover.
7. Verify that ECU power cable (Figure 4, Item 1) is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

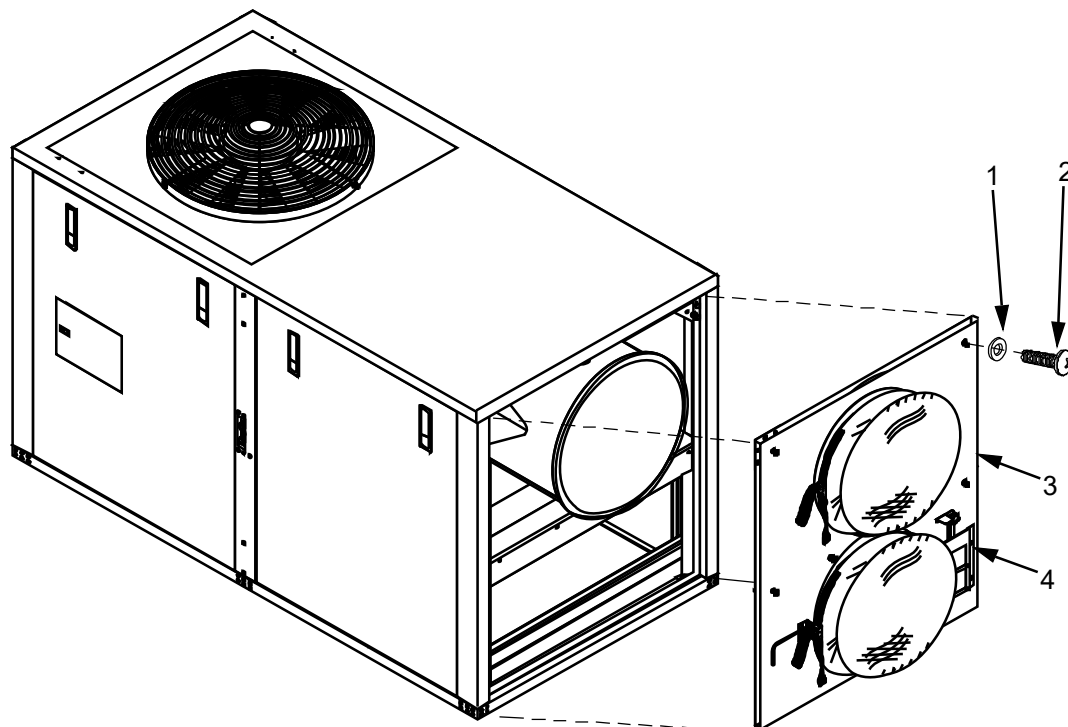


Figure 4. ECU Evaporator Panel Assembly Replace.

END OF TASK

ECU DAMPER ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

Damper plate

References

WP 0005

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. If necessary, remove supply and/or return duct hose from shelter to ECU or duct cover.
3. Set damper rod (Figure 5, Item 1) to the open position.
4. Remove and retain screw (Figure 5, Item 2) that secures damper plate (Figure 5, Item 4) to damper rod (Figure 4, Item 1).

NOTE

When performing the following step, be aware of the spring (Figure 5, Item 5) located on the damper rod (Figure 5, Item 1).

5. Slide damper rod (Figure 5, Item 1) out through damper plate (Figure 5, Item 4), spring (Figure 5, Item 5), lower duct work (Figure 5, Item 6) and duct wall clip (Figure 5, Item 3).
6. Properly discard of all damaged items.

END OF TASK

REPLACEMENT

1. Insert damper rod (Figure 5, Item 1) into duct wall clip (Figure 5, Item 3) and slide through lower duct work (Figure 5, Item 6) approximately three inches.
2. Place spring (Figure 5, Item 5) and damper plate (Figure 5, Item 4) onto damper rod (Figure 5, Item 1). Continue inserting assembly through lower duct work (Figure 5, Item 6).
3. Ensure that damper rod (Figure 5, Item 1) and damper plate (Figure 5, Item 4) are positioned properly. Secure damper plate (Figure 5, Item 4) to damper rod (Figure 5, Item 1) with screw (Figure 5, Item 2).
4. Install supply and/or return duct hose from shelter to ECU or duct cover.
5. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

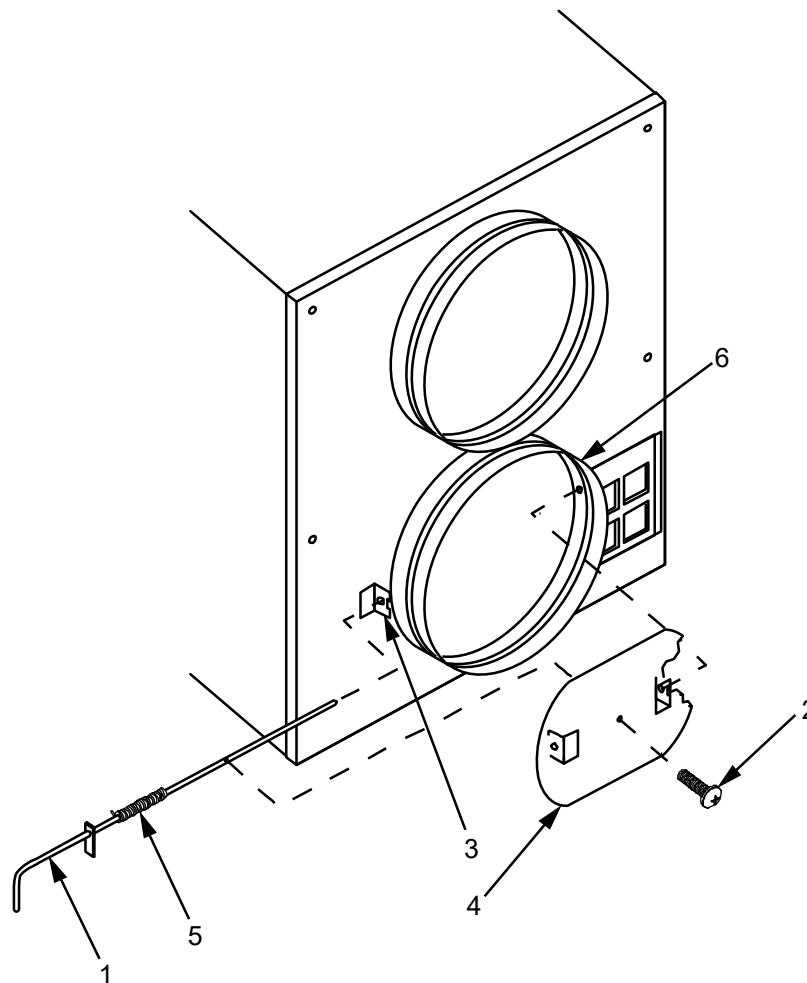


Figure 5. ECU Damper Assembly Replace.

END OF TASK

ECU POWER CABLE REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer,
MOS 91C (1)**Materials/Parts**

Power Cable

Strap Tie-down (WP 0180, Table 1, Item 42-44)

References

WP 0005

Equipment Condition

ECU Shut Down

Power Source – Off

ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Remove ECU Front Panel (Figure 6, Item 6) and Rear Panel (Figure 6, Item 1) and set aside.
2. Disconnect ECU power cable (Figure 6, Item 3) from Power Source.
3. Disconnect ECU communications cable (Figure 6, Item 2) from the associated Genset.
4. Remove all cable ties (Figure 6, Item 4) that secure ECU power cable to other cables and to ECU Bulkhead (Figure 6, Item 5).
4. Open Control Panel (Figure 7, Item 1) and remove three wire raceway covers (Figure 7, Item 2).
5. Loosen nut (Figure 7, Item 6) on power cable connector (Figure 7, Item 8) on bottom of Control Panel Figure 7, Item 7).
6. Cut cable tie holding capacitor in right side raceway (Figure 7, Item 2B) and pull Capacitor out and allow to hang down. Do not remove Capacitor leads from their connections.
7. Disconnect power cable ground lead (Figure 7, Item 10) from ground strip (Figure 7, Item 11).
8. Note power cable colors and positions in power cable Junction block (Figure 7, Item 16).

REMOVAL - Continued

9. Remove silicon gasket material from power cables and remove three ferrites (Figure 7, Item 14).
10. Loosen terminals (Figure 7, Item 15) in power cable junction block (Figure 7, Item 16) that secure power cables (Figure 7, Item 13) and remove from their respective terminals.
11. Remove small ferrites (Figure 7, Item 14) from power cables and set off to the side for re-use.
12. Pull power cables (Figure 7, Item 13) down through raceway (Figure 7, Item 2B) and through large ferrite (Figure 7, Item 5).
13. Grasp cord connector Figure 7, Item 8) from under Control Panel (Figure 7, Item 7) and pull power cable assembly (including three power cables, power cable ground lead, and large cord connector) down and away from Control Panel.
14. Remove cord connector from old power cable and save for reuse.

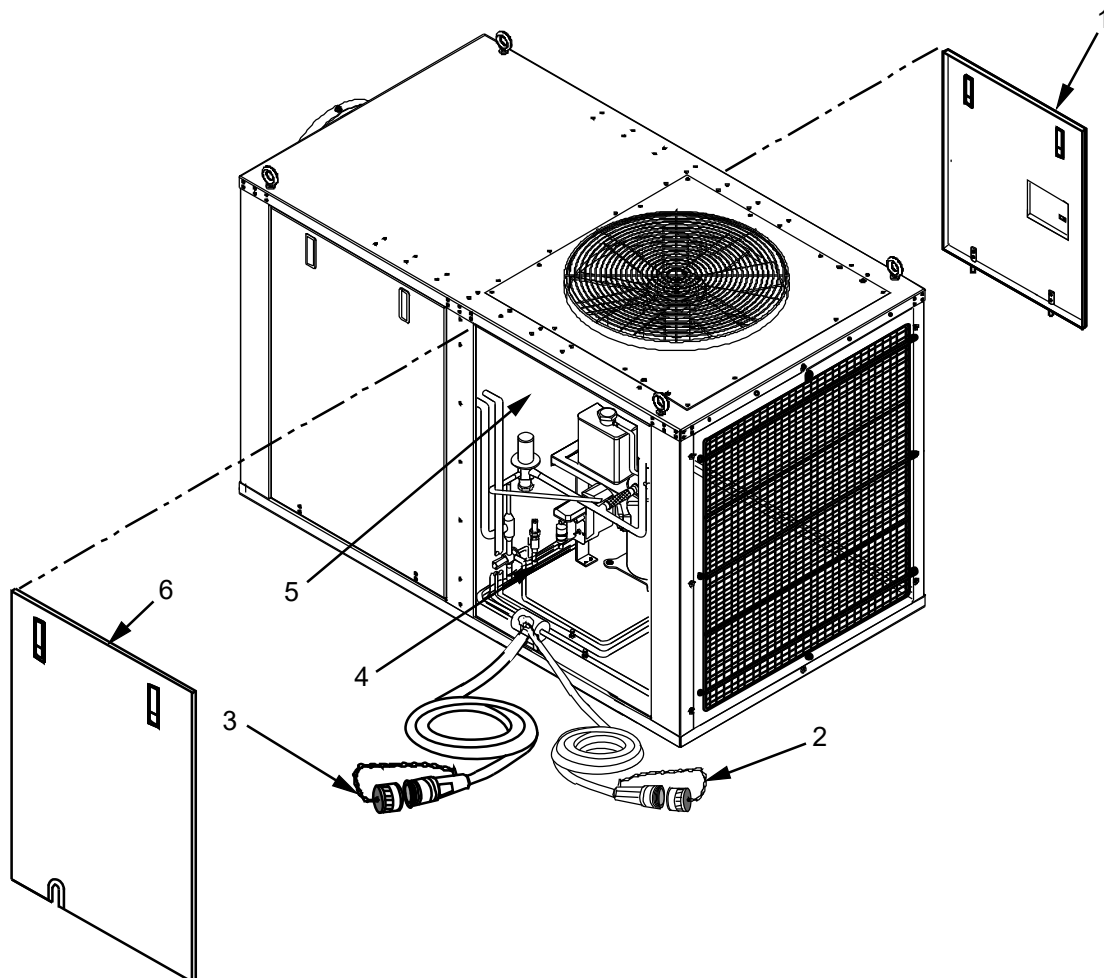


Figure 6. Prepare to Replace ECU Power Cable.

END OF TASK

REMOVAL - Continued

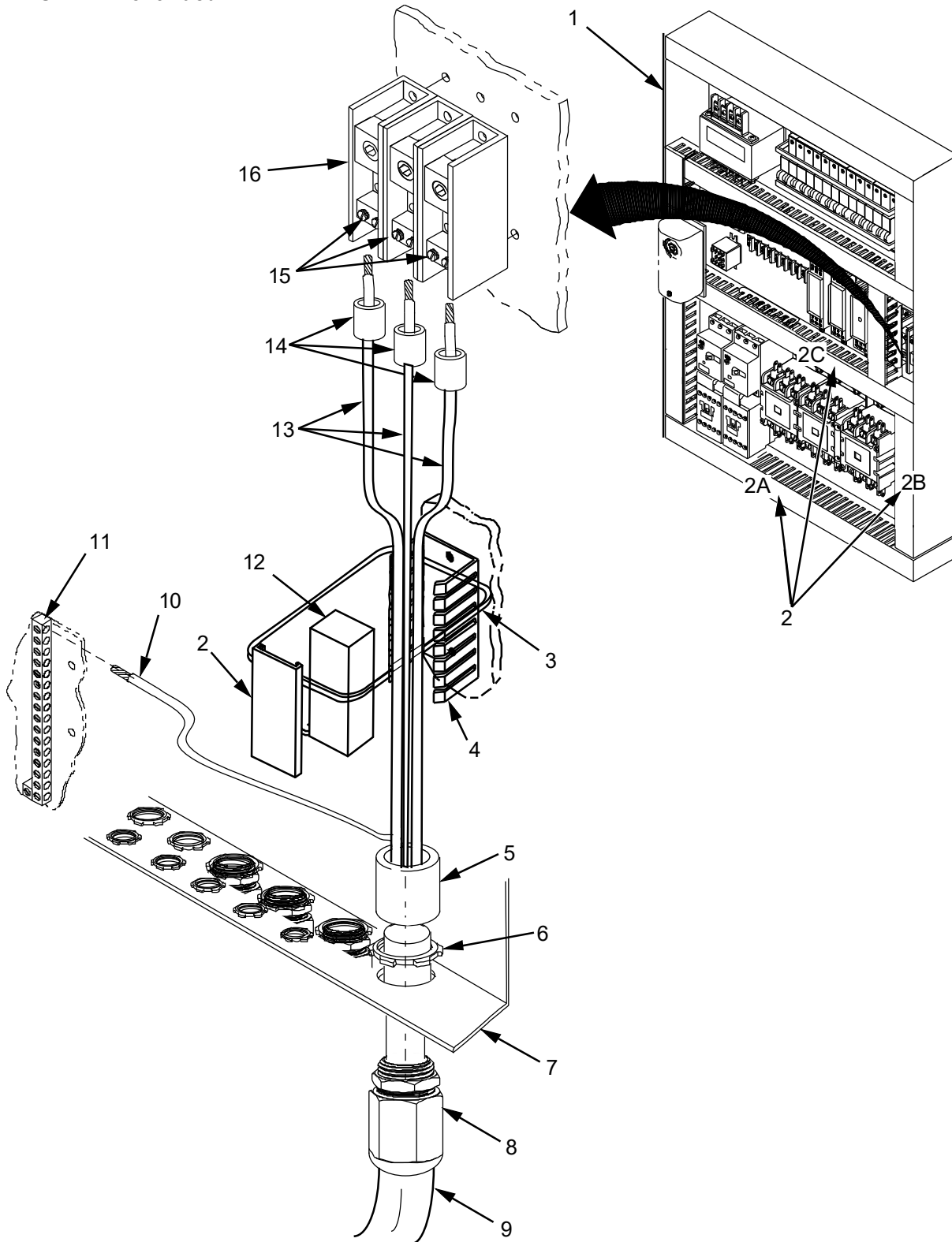


Figure 7. Replace ECU Power Cable.

REPLACEMENT

1. Place cord connector over replacement power cable and slide connector about 18 inches up the length of the cable.
2. Pull the power cable through the bottom of the ECU Control Panel (Figure 7, Item 7). As the power cable is drawn up through the bottom of the Control Panel, place the cord connector nut (Figure 7, Item 6) and the large ferrite (Figure 7, Item 5) over the cable.
3. Draw the power cable all the way through the Control Panel so that the cord connector (Figure 7, Item 8) is drawn into its mounting location.

NOTE

Do not place the power cable into the raceways at this time. Ensure that there is enough cable pulled into the Control Panel to meet all terminals first.

4. Route the power cable upwards until the power cord ends reach the lower terminals (Figure 7, Item 15) of the power cable junction block (Figure 7, Item 16).
5. Separate the ground wire (Figure 7, Item 10) from the power cable group and route to the ground strip (Figure 7, Item 11).
6. Connect the ground wire (Figure 7, Item 10) to the terminal strip (Figure 7, Item 11) and secure.
7. Slide the three small ferrites (Figure 7, Item 14) over the three power cable leads (Figure 7, Item 13).
8. Connect the three power cables to their respective terminals (Figure 7, Item 15) on the power cable junction block (Figure 7, Item 16) and secure the cables.
9. Use silicon gasket material to fill the space between each of the small ferrites to prevent them from moving around.
10. Route the power cables through the raceways (Figure 7, Item 2A, 2B and 2C).
11. Replace the capacitor over top of the power cables in raceways 2B and secure with one large cable tie.
12. Tighten the power cable connector nut Figure 7, Item 6).
13. Replace all raceway covers (Figure 7, Items 2A, 2B, and 2C).
14. Route the remaining end of power cable through the bottom of the ECU along the bulkhead (Figure 6, Item 5) and over to the forward access panel (Figure 6, Item 6).
15. Use cable ties to secure the power cable to various positions along the bottom of the ECU bulkhead Figure 6, Item 5).
16. Close Control Panel door, replace front and rear ECU access covers, and reconnect ECU to power source.
17. Start ECU I accordance with procedures in WP 0005.

END OF TASK

ECU COMMUNICATIONS CABLE REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer,
MOS 91C (1)**Materials/Parts**

Communications Cable

Strap Tie-down (WP 0180, Table 1, Item 42-44)

References

WP 0005

Equipment Condition

ECU Shut Down

Power Source – Off

ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Remove ECU Front Panel (Figure 6, Item 6) and Rear Panel (Figure 6, Item 1) and set aside.
2. Disconnect ECU power cable (Figure 6, Item 3) from Power Source.
3. Disconnect ECU communications cable (Figure 6, Item 2) from the associated Genset.
4. Remove all cable ties (Figure 6, Item 4) that secure ECU communications cable to other cables and to ECU Bulkhead (Figure 6, Item 5).
4. Open Control Panel (Figure 8, Item 1) and remove five wire raceway covers (Figure 7, Item 2A, 2B, 2C, 2D, and 2E).
5. Loosen nut (Figure 8, Item 6) on communications cable connector (Figure 7, Item 8) on bottom of Control Panel Figure 8, Item 7).
6. Loosen center terminal screw in relay (Figure 8, Item 7) that secures communications cable (Figure 8, Item 3) and remove cable from relay.
12. Pull communications cable (Figure 8, Item 3) out of raceways (Figure 7, Item 2E, 2D, 2C, 2B, and 2A).
13. Grasp communications cable connector Figure 8, Item 5) from under Control Panel (Figure 8, Item 1) and pull communications cable assembly down and away from Control Panel.

14. Remove cord connector from old communications cable and save for reuse.

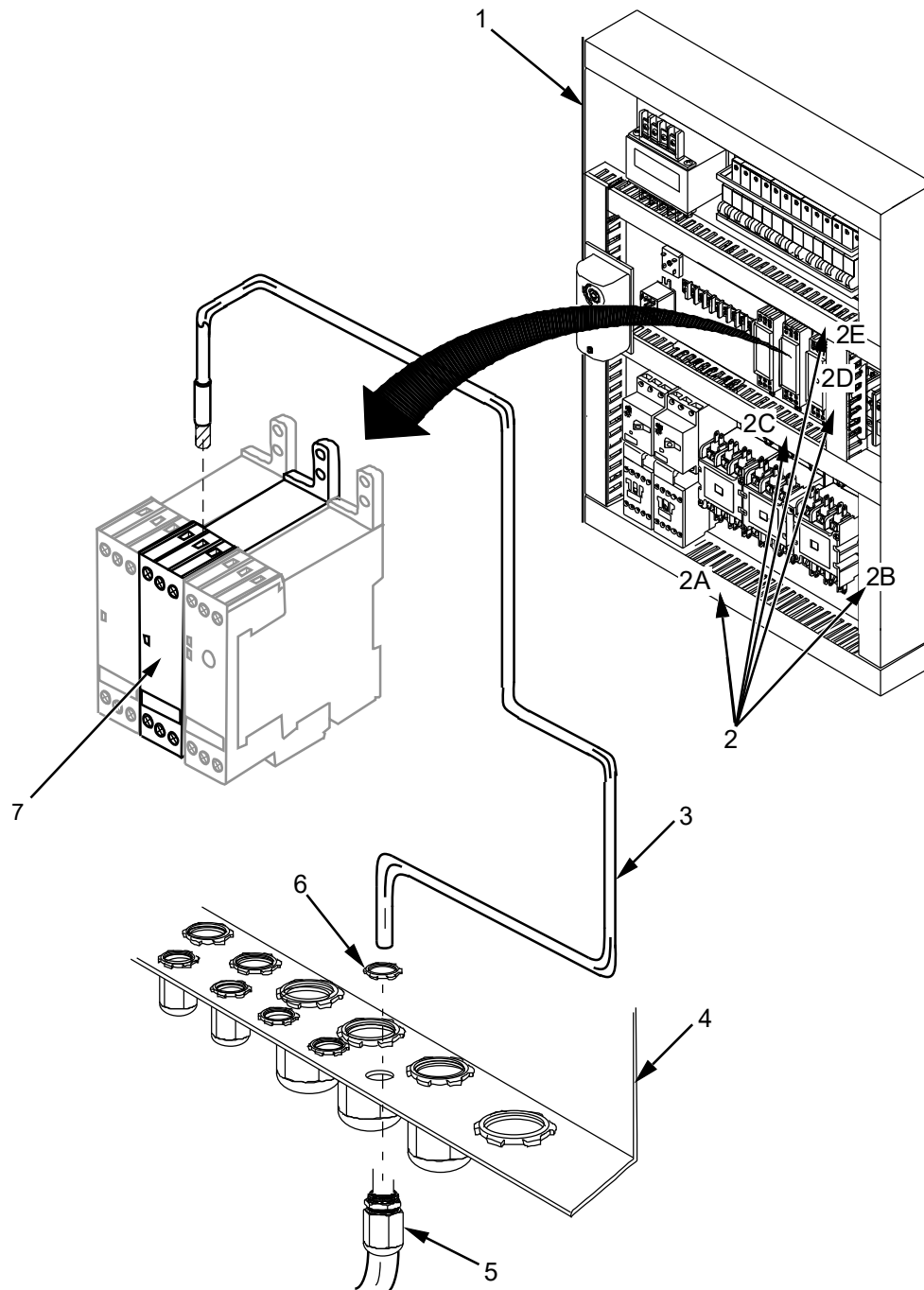


Figure 8. Replace ECU Communications Cable.

END OF TASK

REPLACE

1. Place cord connector (Figure 8, Item 5) over communications cable (Figure 8, Item 3) and pull cable through connector.
2. Grasp communications cable connector (Figure 8, Item 5) from under Control Panel (Figure 8, Item 1) and pull communications cable assembly up into Control Panel.
3. Slide connector nut (Figure 8, Item 6) over communications cable (Figure 8, Item 3) and thread nut onto connector but do not tighten at this time.
4. Route communications cable up to and into relay and secure by tightening center terminal screw (Figure 8, Item 7).
5. Tuck communications cable (Figure 8, Item 3) into raceways (Figure 7, Item 2E, 2D, 2C, 2B, and 2A).
6. Route communications cable through ECU body and secure to other cables and to ECU bulkhead (Figure 6, Item 5) with strap ties.
7. Replace five wire raceway covers (Figure 7, Item 2A, 2B, 2C, 2D, and 2E) and close Open Control Panel (Figure 8, Item 1).
8. Tighten nut (Figure 8, Item 6) on communications cable connector (Figure 7, Item 8) on bottom of Control Panel (Figure 8, Item 7).
9. Replace ECU Front Panel (Figure 6, Item 6) and Rear Panel (Figure 6, Item 1).
10. Connect ECU communications cable (Figure 6, Item 2) to the associated Genset.
11. Connect ECU power cable (Figure 6, Item 3) to Power Source.
12. Start ECU as described in ECU Start Procedure (WP 0005).

END OF TASK

ECU CONDENSER COIL CLEANING

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

Spray bottle (WP 0180, Table 1, Item 41)

Sealing compound (WP 0180, Table 1, Item 38)

References

WP 0005

Equipment Condition

ECU Shut Down

Power Source – Off

ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

CLEANING

1. Verify that ECU (Figure 9, Item 1) has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove rear access panel (Figure 9, Item 2) and forward access panel (Figure 9, Item 7) from ECU.
3. Remove and retain eight screws (Figure 9, Item 4) and eight washers (Figure 9, Item 3) that secure ECU condenser coil grill (Figure 9, Item 5) to the ECU (Figure 9, Item 1).
4. Remove and retain condenser grill (Figure 9, Item 5) and set aside.

CLEANING – Continued**CAUTION**

When performing the following step, be cautious not to damage coil fins. Do not use compressed air for cleaning purposes unless it is less than 30 pounds per square inch gauge (30 psig) and then only with effective chip guarding and personnel protective equipment (industrial or full face shield).

5. Using low pressure air, blow debris from the inside of condenser chamber (Figure 9, Item 6) outwards.
6. Using low pressure water (spray bottle is preferred), rinse debris from the inside of condenser chamber outwards.
7. If necessary, clean condenser coil (Figure 9, Item 6).
8. Allow inside of condenser chamber (Figure 9, Item 7) to dry completely before replacing rear access panel (Figure 9, Item 2) and forward access panel (Figure 9, Item 7) covers.
9. Coat eight screws (Figure 9, Item 4) with sealing compound.
10. Install ECU condenser grill (Figure 9, Item 5) and secure using eight screws (Figure 9, Item 4) and eight washers (Figure 9, Item 3).
11. Start ECU in accordance with Start Procedure (WP 0005).

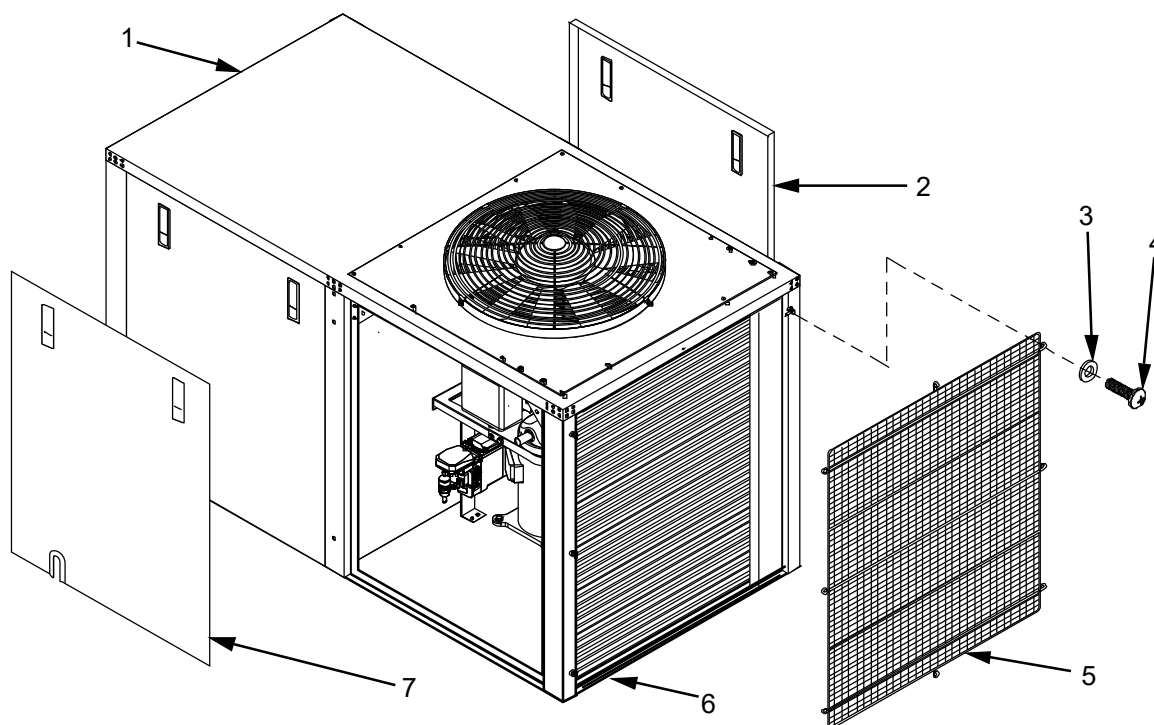


Figure 9. Condenser Coil Cleaning.

END OF TASK

ECU CONDENSER GRILL REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

Sealing compound (WP 0180, Table 1, Item 38)

References

WP 0005

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Remove and retain eight screws (Figure 9, Item 4) and eight washers (Figure 9, Item 3) that secure ECU condenser grill (Figure 9, Item 5).
3. Remove condenser grill (Figure 9, Item 5) and set aside.

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps, inspect condenser coils (Figure 1, Item 4). If necessary, perform cleaning procedure as described in this WP. If the condenser coils are damaged, contact your superior.

1. Coat eight screws (Figure 9, Item 4) with sealing compound.

NOTE

When performing the following step, ensure lattice is on outside of condenser grill.

2. Position condenser grill (Figure 9, Item 5) on to ECU.
3. Secure condenser grill (Figure 9, Item 5) to ECU using eight screws (Figure 9, Item 4) and washers (Figure 9, Item 3).

REPLACEMENT - Continued

4. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CONTROL PANEL THERMOSTAT MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Thermostat Assembly

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the ECU.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the ECU. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages for ECU.

ECU CONTROL PANEL – THERMOSTAT TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**Materials/Parts**

Thermostatic switch

Strap ties (WP 0180, Table 1, Items 42 to 44)

Silicone sealant, RTV (WP 0180, Table 1, Item 39)

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down

Power Source – Off

ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the thermostat.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access cover and open ECU control panel door.
3. Remove and retain screw (Figure 1, Item 1) and cover (Figure 1, Item 2) from thermostat assembly (Figure 1, Item 4).
4. Verify that all electrical wires (Figure 1, Item 11) connected to thermostat (Figure 1, Item 4) are properly identified.
5. Remove and retain four terminal screws (Figure 1, Item 3) from thermostat (Figure 1, Item 4) and disconnect electrical wires (Figure 1, Item 11). Loosely install terminal screws (Figure 1, Item 3) back onto thermostat (Figure 1, Item 4).
6. Remove and retain ground terminal screw (Figure 1, Item 9) from thermostat (Figure 1, Item 4) and disconnect ground wire (Figure 1, Item 10). Loosely install ground terminal screw (Figure 1, Item 9) back into thermostat (Figure 1, Item 4).
7. Remove and retain four screws (Figure 1, Item 7) and washers (Figure 1, Item 6) that secure thermostat (Figure 1, Item 4) to mounting bracket (Figure 1, Item 5).
8. Cut sensor wire (Figure 1, Item 8) at bottom of thermostat (Figure 1, Item 4) and remove thermostat.
9. Follow sensor wire (Figure 1, Item 8) through ECU, removing all strap ties and silicon sealant where applicable.

REMOVAL – Continued

10. Carefully pull sensor wire (Figure 1, Item 8) through all ECU openings back thru control panel and properly discard.

END OF TASK**REPLACEMENT**

1. Install thermostat (Figure 1, Item 4) with sensor wire (Figure 1, Item 8) into control panel and secure using four screws (Figure 1, Item 7) and flat washers (Figure 1, Item 6).
2. If necessary, straighten out sensor wire (Figure 1, Item 8) and begin feeding through control panel and associated ECU feed throughs.
3. Continue feeding sensor wire (Figure 1, Item 8) through ECU around evaporator chamber and blower chamber following same path sensor wire (Figure 1, Item 8) took when being removed.
4. Once sensor wire (Figure 1, Item 8) has been installed, wrap any remaining sensor wire (Figure 1, Item 8) around itself to temporarily secure in place.

WARNING

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well-ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

5. Where applicable, strap tie sensor wire (Figure 1, Item 8) and apply silicone sealant to openings.

NOTE

If necessary, refer to Fold Out Pages for ECU.

6. Connect electrical wires (Figure 1, Item 11) to thermostat (Figure 1, Item 4) using four terminal screws (Figure 1, Item 3).
7. Connect ground wire (Figure 1, Item 10) to thermostat (Figure 1, Item 4) using ground terminal screw (Figure 1, Item 9).

NOTE

Ensure sensor wire is properly seated into slot in thermostat and not pinched when installing cover.

8. Mount cover (Figure 1, Item 2) onto thermostat assembly (Figure 1, Item 4) and secure with screw (Figure 1, Item 1).
9. Close ECU control panel door and install access cover.
10. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

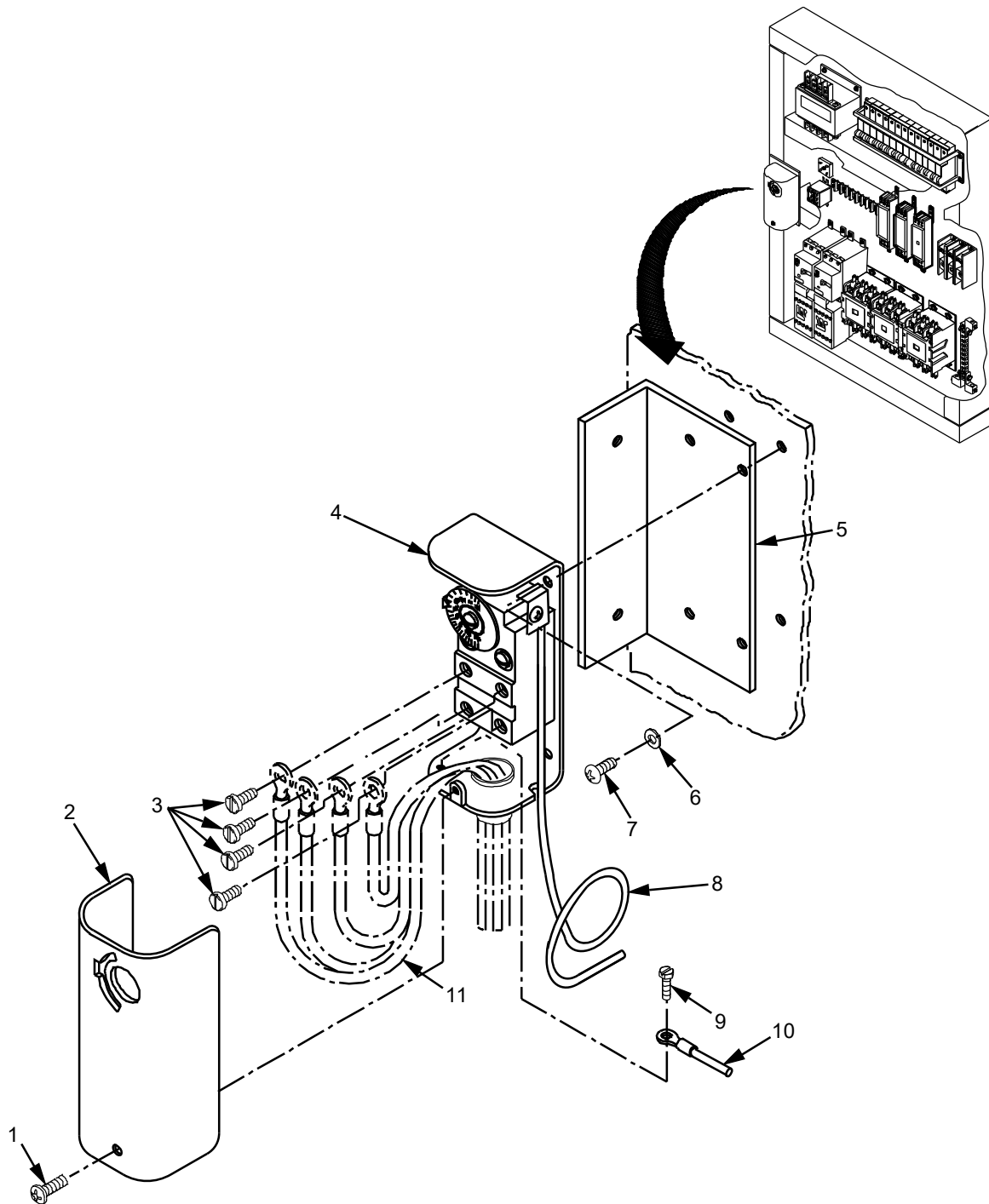


Figure 1. ECU Thermostat Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CONTROL PANEL - SWITCHES & LIGHTS MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- POWER ON light
- OUT OF PHASE light
- HOUR METER
- MODE SELECT Switch
- AUX Heat Switch

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the ECU.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around ECU. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Adhesives, solvents and sealing compounds can burn easily, give off harmful vapors and are harmful to skin and clothing. To avoid injury or death, keep away from open fire and use in well ventilated area. If adhesive, solvent or sealing compound gets in contact with skin or clothing wash immediately with soap and water.

NOTE

If necessary, refer to WP 0045 or troubleshooting and Fold Out Pages for ECU.

ECU CONTROL PANEL DOOR – LIGHTS and METER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer,
MOS 91C (1)

Materials/Parts

Hour Meter
Light sockets

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

POWER ON and OUT OF PHASE LIGHTS**REMOVAL**

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and power cable has been disconnected.
2. Remove access cover and open ECU control panel door.
3. Turn lens cap (Figure 1, Item 9) counter clockwise to release and remove. Set aside.
4. Label each wire attached to lamp holder (Figure 1, Item 5).
5. Loosen lock screws (Figure 1, Item 4) and remove wires from lamp holder (Figure 1, Item 5).
6. Using flat tip screw driver, press in on lamp holder latch (Figure 1, Item 3) to release lamp holder (Figure 1, Item 5) from panel socket (Figure 1, Item 8).
7. If replacing panel socket (Figure 1, Item 8) and panel socket fastener (Figure 1, Item 6), use a flat tip screw driver to pry panel socket fastener (Figure 1, Item 6) from control panel door (Figure 1, Item 7) and remove.

END OF TASK**REPLACEMENT**

1. If replacing panel socket (Figure 1, Item 8) and panel socket fastener (Figure 1, Item 6), insert panel socket (Figure 1, Item 8) into control panel door (Figure 1, Item 7) and snap panel socket fastener (Figure 1, Item 6) onto end.
2. Position lamp holder (Figure 1, Item 5) so that numbering on back is right side up.
3. Press lamp holder (Figure 1, Item 5) into panel socket (Figure 1, Item 8) until it snaps into place.

REPLACEMENT – Continued

4. Connect wires to lamp holder (Figure 1, Item 5) using lock screws (Figure 1, Item 4).
5. Install lens cap (Figure 1, Item 9). Ensure grooves and studs align and press cap in.
6. Turn lens cap (Figure 1, Item 9) clockwise to lock.
7. Close ECU control panel door and install access cover.
8. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

END OF TASK**HOURLY METER****REMOVAL**

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access cover and open ECU control panel door.
3. Mark and disconnect wires from hour meter (Figure 1, Item 13).
4. Remove and retain two screws (Figure 1, Item 14), lock washers (Figure 1, Item 21) and nuts (Figure 1, Item 22) that secure hour meter (Figure 1, Item 13) to control panel (Figure 1, Item 7).
5. Remove hour meter (Figure 1, Item 13) from ECU control panel door (Figure 1, Item 7).

END OF TASK**REPLACEMENT**

1. Insert hour meter (Figure 1, Item 13) into ECU control panel door (Figure 1, Item 7).
2. Secure to control panel door (Figure 1, Item 7) using two screws (Figure 1, Item 14), lock washers (Figure 1, Item 21) and nuts (Figure 1, Item 22).

NOTE

If necessary, refer to Fold Out Pages for ECU.

3. Connect wires to hour meter (Figure 1, Item 13).
4. Close ECU control panel door and install access cover.
5. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

END OF TASK

ECU CONTROL PANEL DOOR – MODE SELECT SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

MODE SELECT Switch

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the MODE SELECT switch.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that ECU power cable has been disconnected.
2. Remove access cover and open ECU control panel door.
3. Mark and disconnect wires from mode select switch (Figure 1, Item 1).
4. Loosen set screw (Figure 1, Item 12) and remove knob (Figure 1, Item 11) from mode select switch (Figure 1, Item 1).
5. Remove and retain nut (Figure 1, Item 10) from front of mode select switch (Figure 1, Item 1).
6. Remove mode select switch (Figure 1, Item 1) and washer (Figure 1, Item 2) from ECU control panel (Figure 1, Item 7).

END OF TASK**REPLACEMENT**

1. Insert mode select switch (Figure 1, Item 1) and washer (Figure 1, Item 2) onto ECU control panel (Figure 1, Item 7) and loosely install nut (Figure 1, Item 10).

NOTE

If necessary, refer to Fold Out Pages for ECU.

2. Secure wires to appropriate terminals on mode select switch (Figure 1, Item 1).

REPLACEMENT – Continued

3. Properly position mode select switch (Figure 1, Item 1) onto ECU control panel (Figure 1, Item 7) and tighten nut (Figure 1, Item 10).
4. Properly position knob (Figure 1, Item 11) onto mode select switch (Figure 1, Item 1). Tighten set screw (Figure 1, Item 12).
5. Close ECU control panel door and install access cover.
6. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

END OF TASK

ECU CONTROL PANEL DOOR – AUXILIARY HEAT SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer,
MOS 91C (1)

Materials/Parts

AUX Heat Switch

References

WP 0005

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access cover and open ECU control panel door.
3. Ensure wires from auxiliary heat switches (Figure 1, Items 18 and 19) are properly marked.
4. Loosen lock screws (Figure 1, Item 20) and remove wiring.
5. Using flat tip screw driver press latch to release switch (Figure 1, Item 18 or 19) from bracket (Figure 1, Item 17).
6. If replacing auxiliary heat switch socket (Figure 1, Item 15) and panel socket fastener (Figure 1, Item 16), use a flat tip screw driver to pry panel socket fastener (Figure 1, Item 16) from control panel door (Figure 1, Item 7) and remove.

END OF TASK

REPLACEMENT

1. Insert auxiliary heat switch socket (Figure 1, Item 15) into ECU control panel (Figure 1, Item 7) and secure using panel socket fastener (Figure 1, Item 16).
2. Ensure bracket (Figure 1, Item 17) is properly positioned.
3. Position auxiliary heat switches (Figure 1, Items 18 and 19) so that numbering on back is right side up.
4. Press auxiliary heat switches (Figure 1, Items 18 and 19) into bracket (Figure 1, Item 17) until they snap into place.

NOTE

If necessary, refer to Fold Out Pages for ECU.

5. Connect wires to auxiliary heat switches (Figure 1, Items 18 and 19) using lock screws (Figure 1, Item 20).
6. Close ECU control panel door (Figure 1, Item 18) and install access cover (Figure 1, Item 1).
7. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

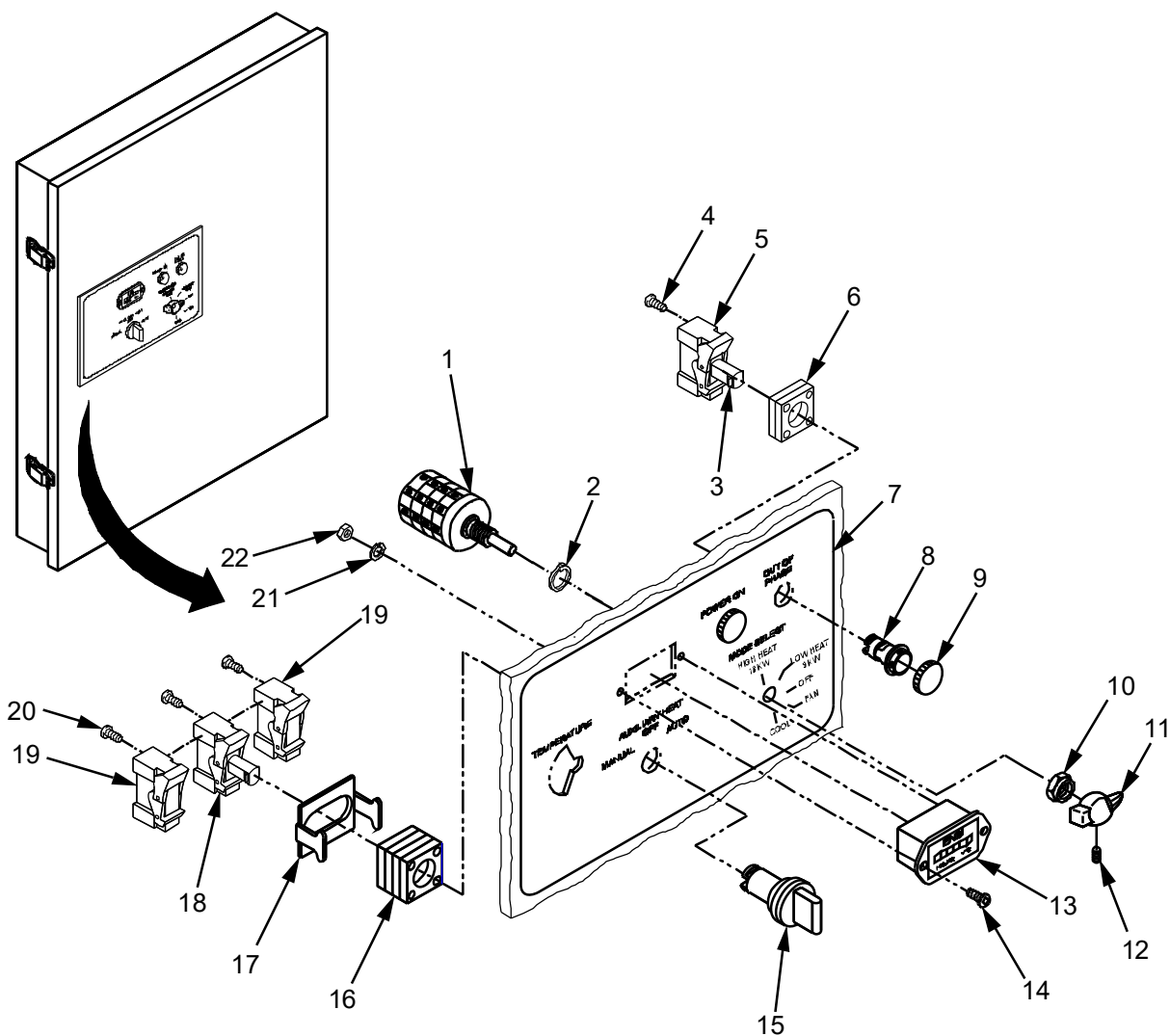


Figure 1. ECU Control Panel Faceplate and Components Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CONTROL PANEL – CIRCUIT BREAKERS MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Circuit breaker (CB1)
- Circuit breaker (CB2)
- Circuit breaker (CB3)
- Circuit breaker (CB4)
- Circuit breaker (CB5)

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present in the Control Panel. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

The following procedures apply to all circuit breakers listed in this WP.

If necessary, refer to WP 0045 and WP 0046 for troubleshooting and Fold Out Pages for ECU.

ECU CIRCUIT BREAKERS REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Circuit breaker(s)

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the circuit breakers.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 7) connected to circuit breaker (Figure 1, Item 3) being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 1, Item 6) securing electrical wires (Figure 1, Item 7) to circuit breaker (Figure 1, Item 3). Remove electrical wires (Figure 1, Item 7) from circuit breaker(s) (Figure 1, Item 3).
5. Remove and retain four screws (Figure 1, Item 1) that secure hold down clamp (Figure 1, Item 8) to control panel (Figure 1, Item 4) and remove hold down clamp (Figure 1, Item 8).
6. Pull out grey hold down tabs (Figure 1, Item 2) located on top and bottom of circuit breaker (Figure 1, Item 3) and pull circuit breaker (Figure 1, Item 3) away from mounting bracket (Figure 1, Item 5).

END OF TASK**REPLACEMENT**

1. Pull out grey hold down tabs (Figure 1, Item 2) located on top and bottom of circuit breaker (Figure 1, Item 3).
2. Insert circuit breaker (Figure 1, Item 3) onto mounting bracket (Figure 1, Item 5) and close grey hold down tabs (Figure 1, Item 2).

REPLACEMENT – Continued**NOTE**

If necessary, refer to Fold Out Pages for ECU.

3. Loosen but do not remove terminal screws (Figure 1, Item 6). Insert electrical wires (Figure 1, Item 7) into circuit breaker(s) (Figure 1, Item 3) and tighten terminal screws (Figure 1, Item 6).
4. Install hold down clamp (Figure 1, Item 8) across circuit breakers (Figure 1, Item 3). Secure to control panel (Figure 1, Item 4) using four screws (Figure 1, Item 1).
5. Close ECU control panel door and install access cover.
6. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

NOTE

If necessary, refer to Fold Out Pages for ECU.

Table 1. Circuit Breaker Connections/Wire ID Numbers.

CIRCUIT BREAKER	AMPS	INPUT	OUTPUT
CB1	5 Amp	32	34A
CB2	1.6 Amp	12F	30A
		13F	31A
		14F	10
CB3	32 Amp	12C	21A
		13C	22A
		14C	23A
CB4	32 Amp	12D	21B
		13D	22B
		14D	23B
CB5	32 Amp	12E	21C
		13E	22C
		14E	23C

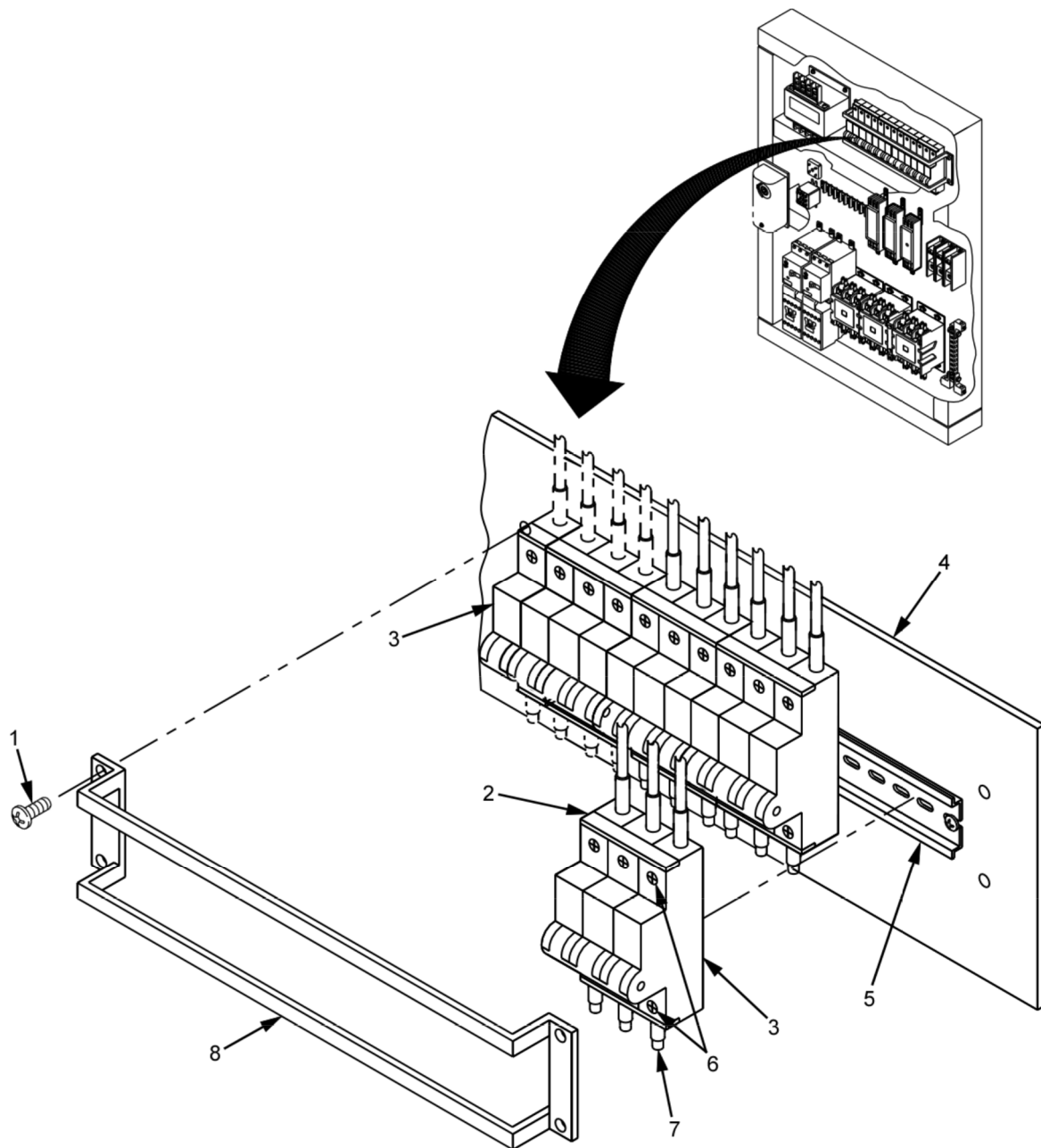


Figure 1. Circuit Breaker Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CONTROL PANEL – CONTACTORS MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Heater contactor low (LHT)
- Heater contactor high (HHT)
- Compressor contactor (CCR)

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present in the Control Panel. Before starting this task, ensure all power is de-energized and disconnected from Power Source. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

The following procedures apply to all contactors listed in this WP.

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages for ECU.

ECU CONTROL PANEL CONTACTORS TEST/REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Contactors

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the contactors.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected from Power Source.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 5) connected to contactor being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 1, Item 6) securing all electrical wires (Figure 1, Item 5) to contactor (Figure 1, Item 1) being replaced. Remove electrical wires (Figure 1, Item 5) from contactor (Figure 1, Item 1).
5. Remove and retain four screws (Figure 1, Item 4) that secure bracket (Figure 1, Item 2) to control panel (Figure 1, Item 3).
6. Remove contactor (Figure 1, Item 1) from control panel (Figure 1, Item 3).

END OF TASK**REPLACEMENT**

1. Install contactor (Figure 1, Item 1) onto control panel (Figure 1, Item 3).
2. Secure bracket (Figure 1, Item 2) to control panel (Figure 1, Item 3) with four screws (Figure 1, Item 4).
3. Inspect all electrical wires (Figure 1, Item 5) being connected. Ensure no physical damage is present. If necessary, repair or replace.

REPLACEMENT – Continued

4. Loosen but do not remove terminal screws (Figure 1, Item 6) on contactor (Figure 1, Item 1). Install all electrical wires (Figure 1, Item 5) and tighten terminal screws (Figure 1, Item 6).
5. Close ECU control panel door and install access cover.
6. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

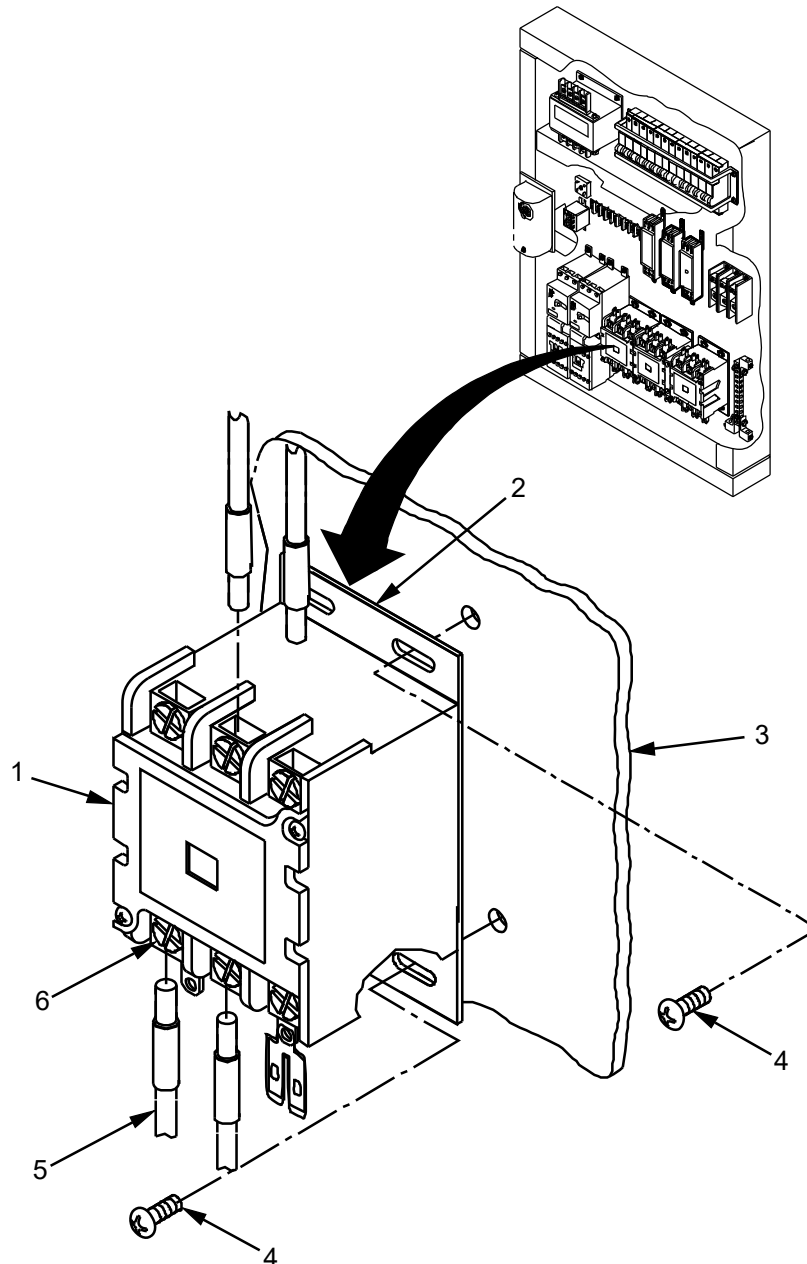


Figure 1. Contactor Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CONTROL PANEL – RELAYS MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Phase Sequence Relay (PSR)
- Time Delay Relay (TD)
- Load Shed Control Relay 1 (CR1)
- Load Shed Control Relay 2 (CR2)

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present at the PDP. Before starting this task, ensure all power is de-energized. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

ECU CONTROL PANEL: PSR, CR1, TD RELAY REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer,
MOS 91C (1)

Materials/Parts

Relay(s)

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the relays.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected from Power Source.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 4) connected to relay being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 1, Item 5) securing electrical wires (Figure 1, Item 4) to relay (Figure 1, Item 2). Remove electrical wires (Figure 1, Item 4) from relay (Figure 1, Item 2).
5. Remove and retain two screws (Figure 1, Item 1) that secure relay (Figure 1, Item 2) to control panel (Figure 1, Item 3) and remove relay (Figure 1, Item 2).

END OF TASK**REPLACEMENT**

1. Install relay (Figure 1, Item 2) onto control panel (Figure 1, Item 3) and secure using two screws (Figure 1, Item 1).
2. Inspect all electrical wires (Figure 1, Item 4) being connected. Ensure no physical damage is present. If necessary, repair or replace.
3. Loosen but do not remove terminal screws (Figure 1, Item 5) on relay (Figure 1, Item 2). Install all electrical wires (Figure 1, Item 4) and tighten terminal screws (Figure 1, Item 5).

REPLACEMENT – Continued

4. Close ECU control panel door and install access cover.
5. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

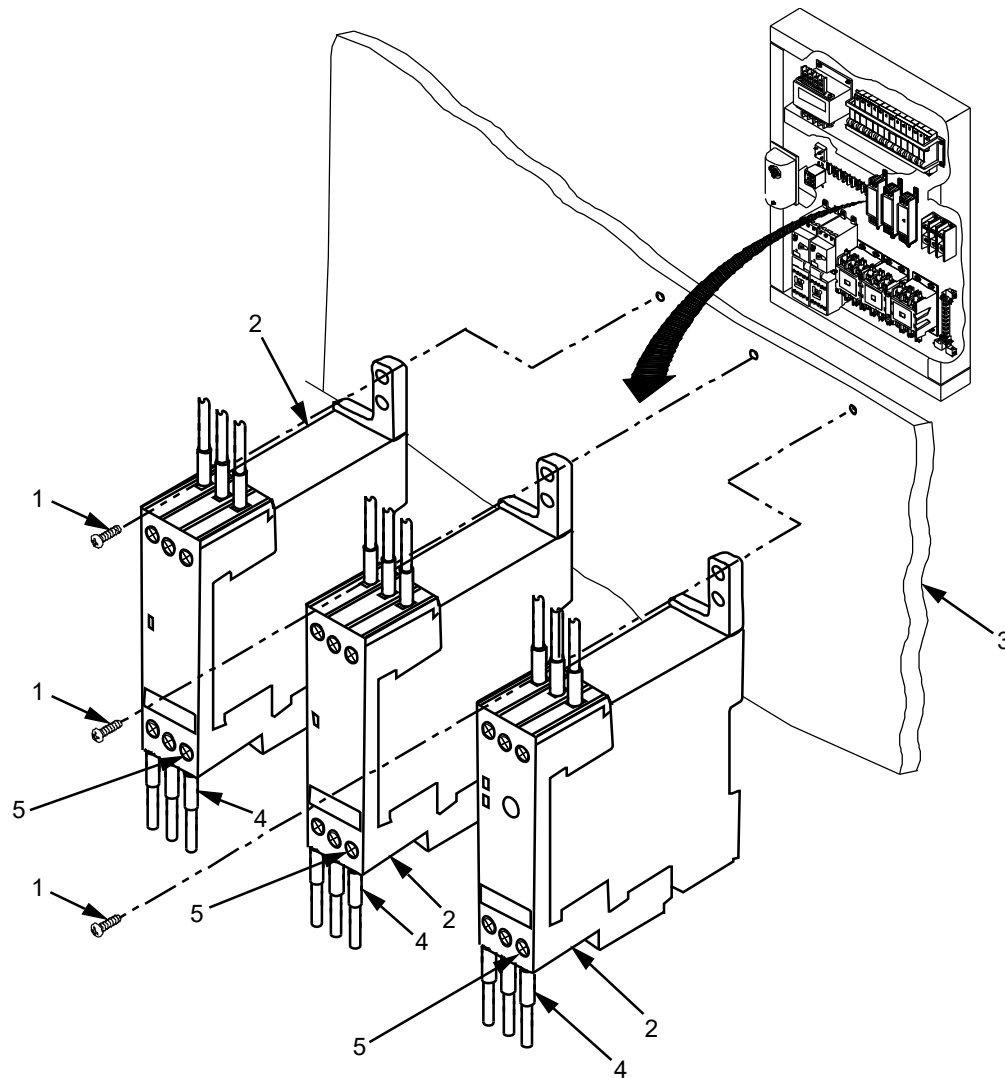


Figure 1. Relay Replace.

END OF TASK

ECU CONTROL PANEL: CR2 RELAY REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer,
MOS 91C (1)

References

WP 0005, WP 0045,

Materials/Parts

Relay

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the relays.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected from Power Source.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 2, Item 5) connected to relay being replaced is properly identified.
4. Reach behind Control Panel (Figure 2, Item 4) and locate retaining nuts (Figure 2, Item 3). Remove and retain two screws (Figure 2, Item 1) and two nuts (Figure 2, Item 3) that secure relay (Figure 2, Item 2) to control panel (Figure 2, Item 4) and remove relay (Figure 2, Item 2).

END OF TASK**REPLACEMENT**

1. Install relay (Figure 2, Item 2) onto control panel (Figure 2, Item 4) and secure using two screws (Figure 2, Item 1) and two nuts (Figure 2, Item 3).
2. Inspect all electrical wires (Figure 2, Item 5) being connected. Ensure no physical damage is present. If necessary, repair or replace.

REPLACEMENT – Continued

3. Close ECU control panel door and install access cover.
4. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

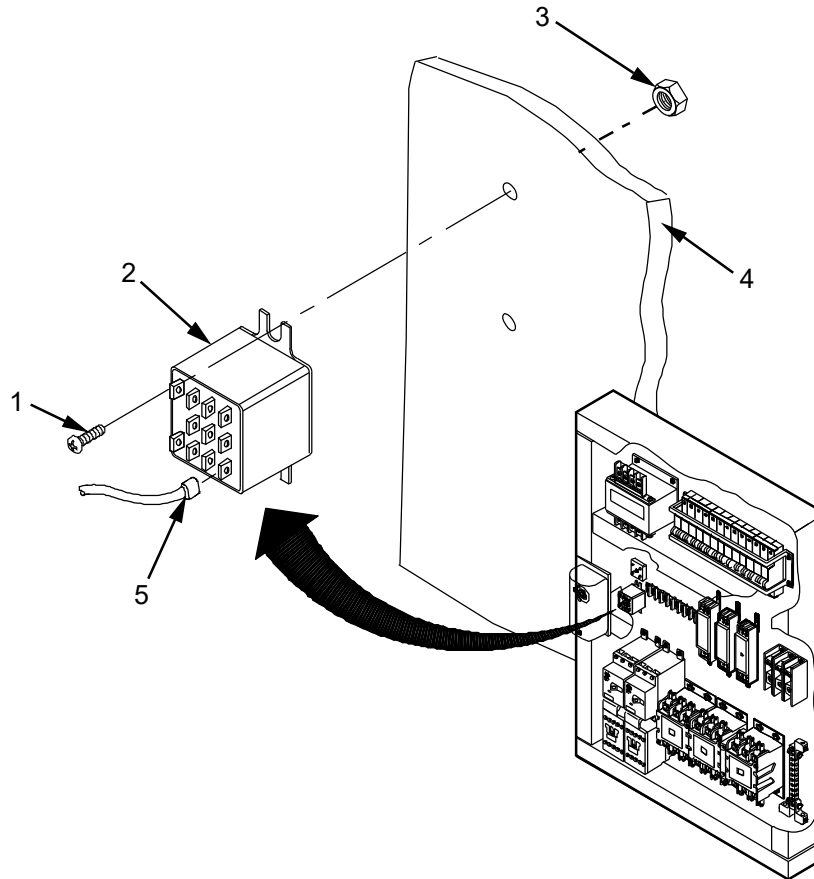


Figure 2. Relay CR2 Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer**ECU CONTROL PANEL – TRANSFORMER AND BRIDGE RECTIFIER MAINTAINER MAINTENANCE**

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Transformer, Power, step-down (TX1)
- Bridge rectifier (BR)

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present in the ECU Control Panel. Before starting this task, ensure all power is de-energized. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages for ECU.

ECU CONTROL PANEL TRANSFORMER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Transformer

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the transformer.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP007), Power Source is shut down, and that power cable has been disconnected from Power Source.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 1) connected to transformer (Figure 1, Item 4) are properly identified.
4. Remove and retain terminal screws (Figure 1, Item 5) securing electrical wires (Figure 1, Item 1) to transformer (Figure 1, Item 4). Remove electrical wires (Figure 1, Item 1) away from transformer (Figure 1, Item 4).
5. Remove four screws (Figure 1, Item 3) that secure transformer (Figure 1, Item 4) to control panel (Figure 1, Item 2).
6. Remove transformer (Figure 1, Item 4) and set aside.

END OF TASK**REPLACEMENT****NOTE**

If necessary, refer to Fold Out Pages for ECU.

1. Install transformer (Figure 1, Item 4) onto control panel (Figure 1, Item 2) and secure using four screws (Figure 1, Item 3).

REPLACEMENT – Continued

2. Inspect all electrical wires (Figure 1, Item 1) being connected. Ensure no physical damage is present. If necessary, repair or replace.
3. Remove terminal screws (Figure 1, Item 5) from transformer (Figure 1, Item 4). Connect all electrical wires (Figure 1, Item 1) and install terminal screws (Figure 1, Item 5).
4. Close ECU control panel door and install access cover.
5. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

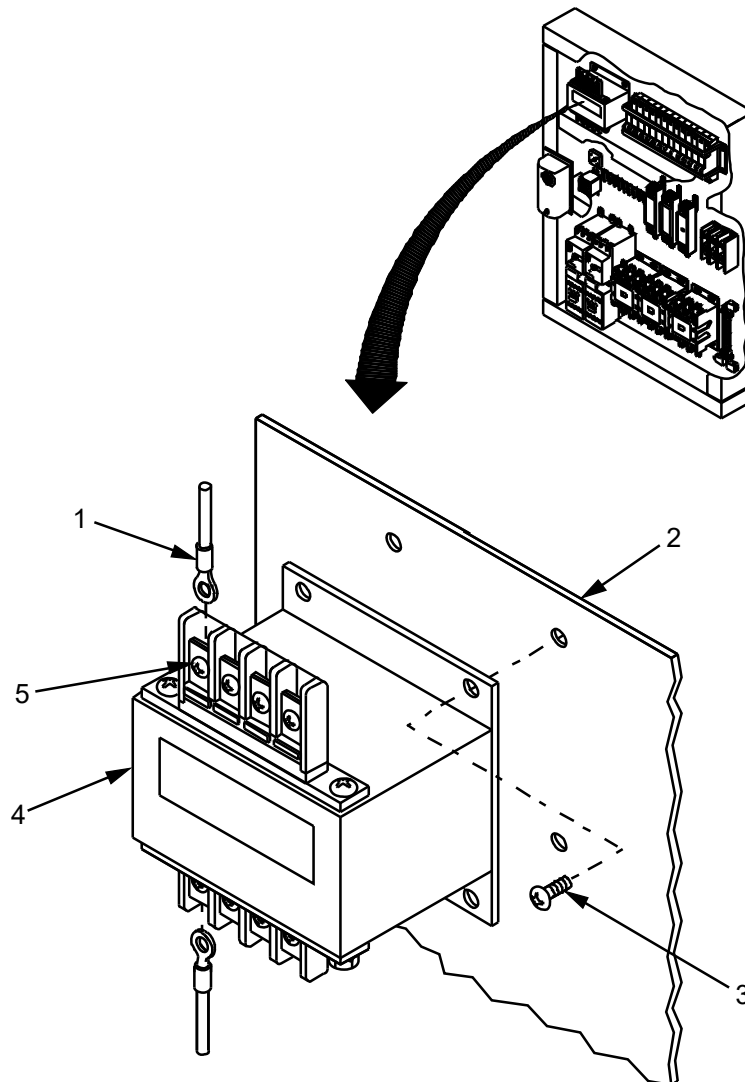


Figure 1. Transformer Replace.

END OF TASK

ECU CONTROL PANEL BRIDGE RECTIFIER (BR) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Bridge rectifier

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the bridge rectifier.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 2, Item 4) connected to bridge rectifier (Figure 2, Item 1) are properly identified.
4. Disconnect electrical wires (Figure 2, Item 4) from bridge rectifier (Figure 2, Item 1).
5. Remove and retain screw (Figure 2, Item 3) and flat washer (Figure 2, Item 5) that secure bridge rectifier (Figure 2, Item 1) to control panel (Figure 2, Item 2) and remove bridge rectifier (Figure 2, Item 1).

END OF TASK**REPLACEMENT**

1. Install bridge rectifier (Figure 2, Item 1) onto control panel (Figure 2, Item 2) and secure using screw (Figure 2, Item 3), and flat washer (Figure 2, Item 5).
2. Inspect all electrical wires (Figure 2, Item 4) being connected. Ensure no physical damage is present. If necessary, repair or replace.

REPLACEMENT - Continued**NOTE**

If necessary, refer to Fold Out Pages for ECU.

3. Connect all electrical wires (Figure 2, Item 4) to appropriate terminals on bridge rectifier (Figure 2, Item 1).
4. Close ECU control panel door and install access cover.
5. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

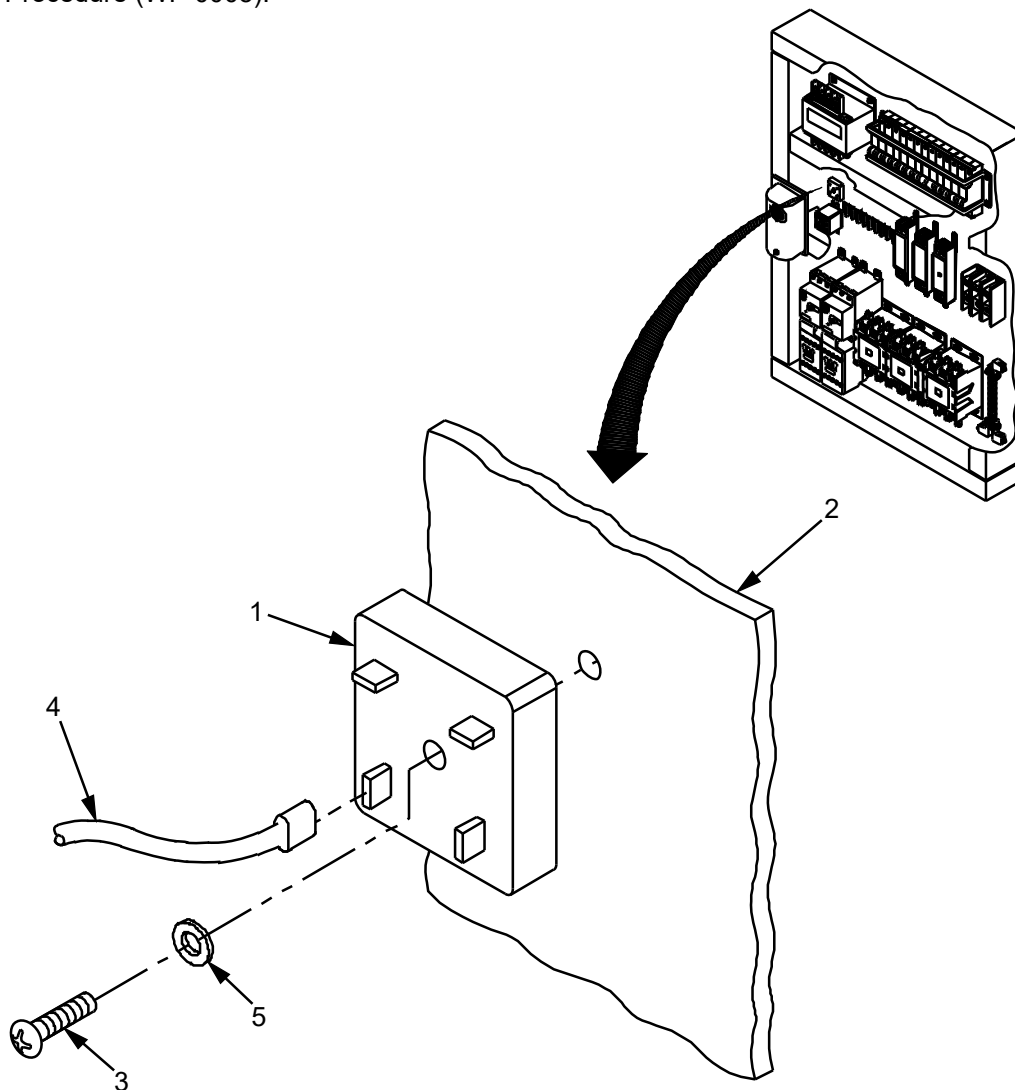


Figure 2. Bridge Rectifier Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CONTROL PANEL – STARTER PROTECTORS MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Compressor Motor Starter Protector (CMSP)
- Evaporator Motor Starter Protector (EMSP)

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

If necessary, refer to WP 0045 for troubleshooting and schematic/wiring diagrams of ECU.

ECU CONTROL PANEL CMSP/EMSP REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

CMSP
EMSP

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

If necessary, refer to WP 0045 for test of the CMSP/EMSP.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access cover and open ECU control panel door.
3. Remove wire way covers (not shown).
4. Verify that all electrical wires (Figure 1, Item 4) connected to the CMSP/EMSP being replaced are properly identified.
5. Loosen but do not remove terminal screws (Figure 1, Item 5) securing electrical wires (Figure 1, Item 4) to CMSP/EMSP (Figure 1, Item 1). Remove electrical wires (Figure 1, Item 4) from CMSP/EMSP (Figure 1, Item 1).
6. Remove and retain four screws (Figure 1, Item 3) that secure CMSP/EMSP (Figure 1, Item 1) to control panel (Figure 1, Item 2) remove CMSP/EMSP (Figure 1, Item 1).

END OF TASK**REPLACEMENT**

1. Install CMSP/EMSP (Figure 1, Item 1) onto control panel (Figure 1, Item 2) and secure using four screws (Figure 1, Item 3).
2. Inspect all electrical wires (Figure 1, Item 4) being connected. Ensure no physical damage is present. If necessary, repair or replace.

REPLACEMENT - Continued

NOTE

If necessary, refer to Fold Out Pages/wiring diagrams of ECU.

3. Loosen but do not remove terminal screws (Figure 1, Item 5) on CMSP/EMSP (Figure 1, Item 1). Install all electrical wires (Figure 1, Item 4) and tighten terminal screws (Figure 1, Item 5).
4. Replace wire way covers (not shown).
5. Close ECU control panel door and install access cover.
6. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

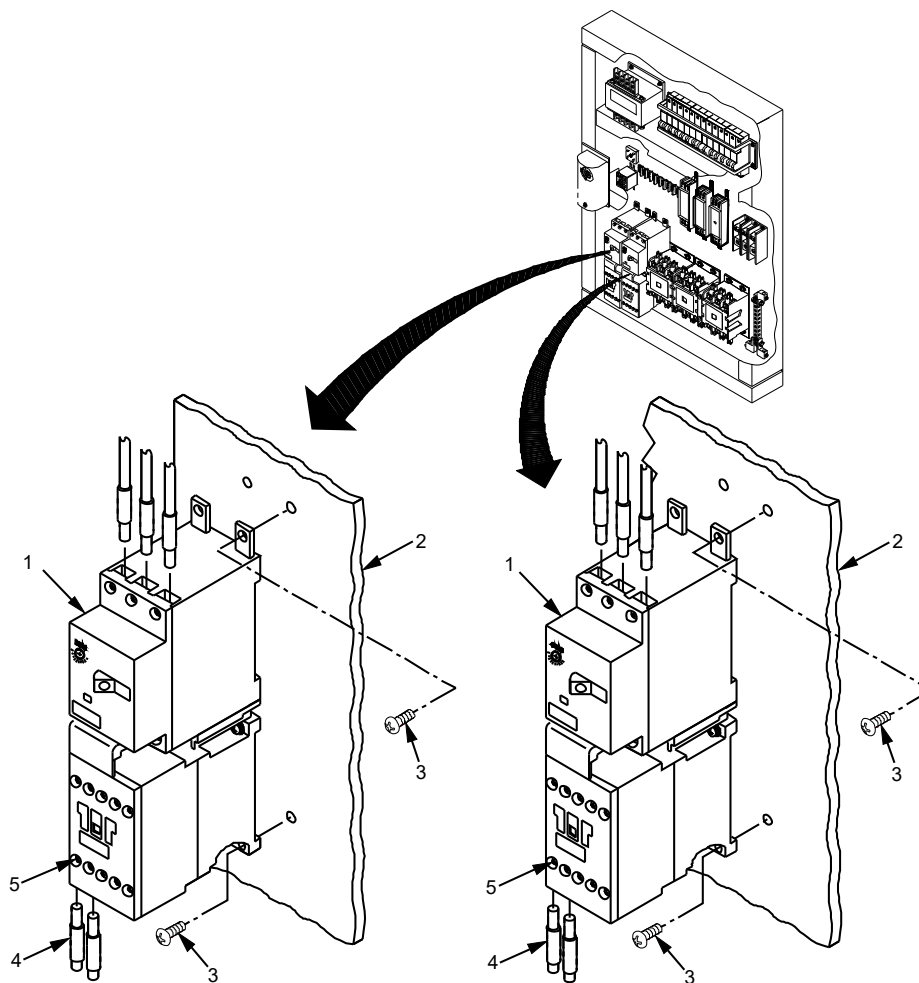


Figure 1. CMSP/EMSP Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
ECU CONTROL PANEL - TERMINAL BOARD, GROUNDING BLOCK, AND POWER DISTRIBUTION
BLOCK MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the following components on the ECU. They consist of:

- Terminal Board-removal/replacement
- Grounding Block-removal/replacement
- Power Distribution Block-removal/replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure hand brakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If ECU has been in operation, components may be extremely hot/extremely cold. To prevent serious injury to personnel, allow the ECU to warm-up/cool down before performing procedures.

Never attempt to connect/disconnect cables or perform maintenance when ECU is in operation. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure or open control panel with ECU operating. Always ensure CB4 of Genset is shut down before attempting to perform any of the following procedures.

Remove rings, bracelets, wristwatches, neck chain, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across electrical circuits and cause severe burns or electrical shock. Failure to observe this warning can result in serious injury or death.

NOTE

If necessary, refer to WP 0045 for troubleshooting and schematic/wiring diagrams of ECU.

ECU TERMINAL BOARD (TB) REMOVAL/REPLACEMENT**INITIAL SETUP:****Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Terminal board

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB5 on Genset is shut down and that power cable has been disconnected from J4 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 1, Item 3) connected to the terminal board (Figure 1, Item 1) being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 1, Item 4) and remove all electrical connections (Figure 1, Item 3).
5. Remove and retain two screws (Figure 1, Item 5) securing terminal board (TB) (Figure 1, Item 1) to control panel (Figure 1, Item 2). Remove terminal board (TB) (Figure 1, Item 1).

END OF TASK**REPLACEMENT**

1. Install terminal board (TB) (Figure 1, Item 1) onto control panel (Figure 1, Item 2) and secure using retain two screws (Figure 1, Item 5).

NOTE

If necessary, refer to Fold Out Pages for ECU.

2. Loosen but do not remove terminal screws (Figure 1, Item 4). Connect electrical wires (Figure 1, Item 3) and tighten terminal screws (Figure 1, Item 4).
3. Close ECU control panel door and install access cover.
4. Verify that ECU power cable is connected to J4 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005).

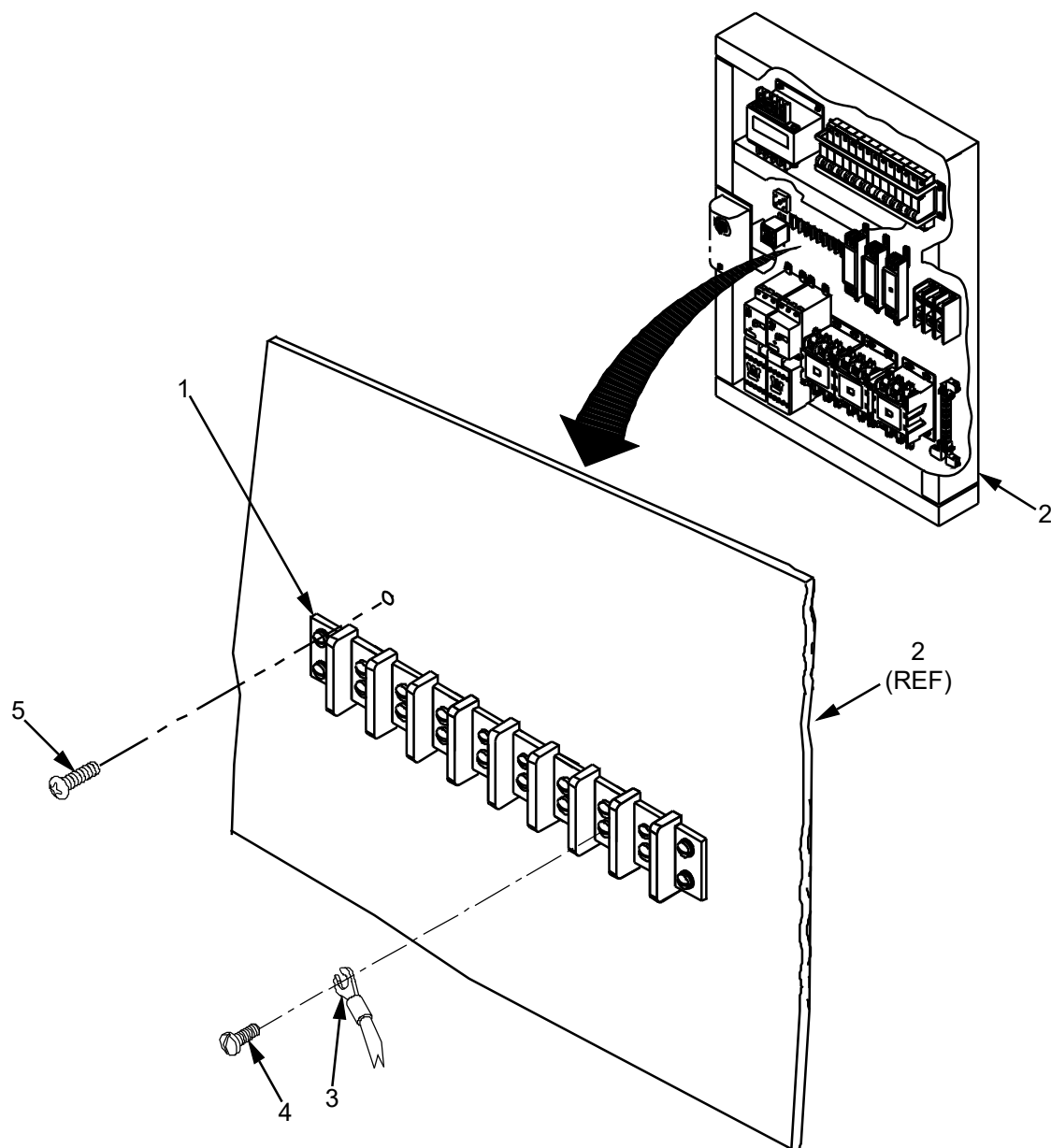


Figure 1. Terminal Board (TB) Removal/Replacement.

END OF TASK

ECU GROUNDING BLOCK (GB) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Grounding block

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB5 on Genset is shut down and that power cable has been disconnected from J4 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 2, Items 3 and 5) connected to the grounding blocks (Figure 2, Items 1 & 2) being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 2, Item 7) and remove all electrical connections (Figure 2, Items 3 and 5).
5. Remove and retain two screws (Figure 2, Item 6) securing grounding blocks (Figure 2, Items 1 and 2) to control panel (Figure 2, Item 4). Remove grounding block (Figure 3, Items 1 and 2).

END OF TASK**REPLACEMENT**

1. Install grounding block (Figure 2, Items 1 and 2) onto control panel (Figure 2, Item 4) and secure using two screws (Figure 2, Item 6).

NOTE

If necessary, refer to Fold Out Pages, wiring diagrams and wire lists for the ECU.

2. Loosen but do not remove terminal screws (Figure 2, Item 7). Connect electrical wires (Figure 2, Items 3 and 5) and tighten terminal screws (Figure 2, Item 7).
3. Close ECU control panel door and install access cover.

REPLACEMENT - Continued

4. Verify that ECU power cable is connected to J4 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005).

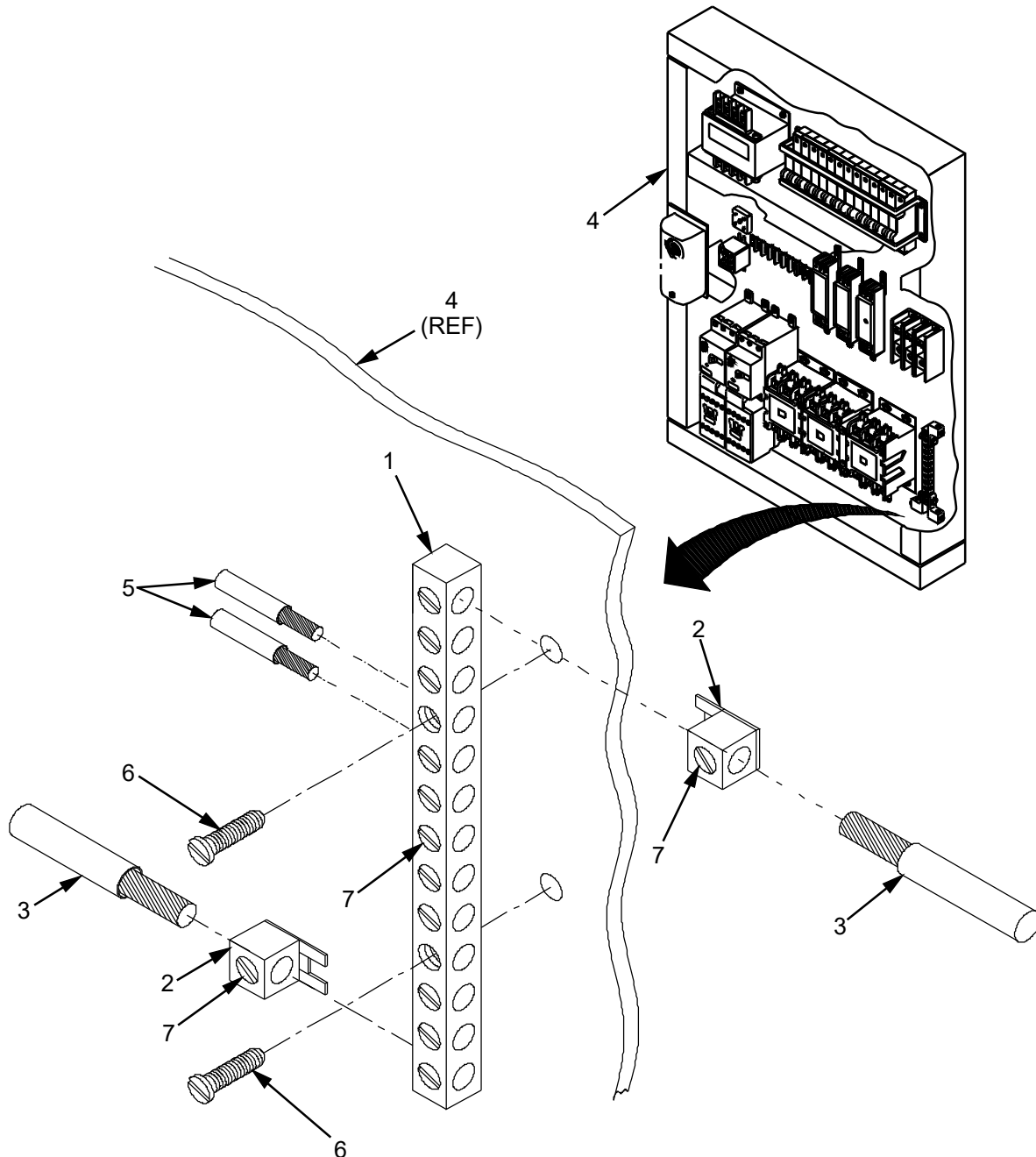


Figure 2. Grounding Block Removal/Replacement.

END OF TASK

ECU POWER DISTRIBUTION BLOCK (PDB) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Power distribution block

References

WP 0005, WP 0045, Fold Out
Pages

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), CB5 on Genset is shut down and that power cable has been disconnected from J4 of power distribution panel on Genset.
2. Remove access cover and open ECU control panel door.
3. Verify that all electrical wires (Figure 3, Items 1 and 5) connected to the power distribution block (Figure 3, Item 4) being replaced are properly identified.
4. Loosen but do not remove terminal screws (Figure 3, Items 6 and 7) and remove all electrical connections (Figure 3, Items 1 and 5).
5. Remove and retain four screws (Figure 3, Item 3) securing power distribution block (Figure 3, Item 4) to control panel (Figure 3, Item 2). Remove power distribution block (Figure 3, Item 4).

END OF TASK**REPLACEMENT**

1. Install power distribution block (Figure 3, Item 4) onto control panel (Figure 3, Item 2) and secure using four screws (Figure 3, Item 3).

NOTE

If necessary, refer to Fold Out Pages, wiring diagrams and wire lists for the ECU.

2. Loosen but do not remove terminal screws (Figure 3, Items 6 and 7). Connect electrical wires (Figure 3, Items 1 and 5) and tighten terminal screws (Figure 3, Items 6 and 7).
3. Close ECU control panel door and install access cover.

REPLACEMENT - Continued

4. Verify that ECU power cable is connected to J4 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005).

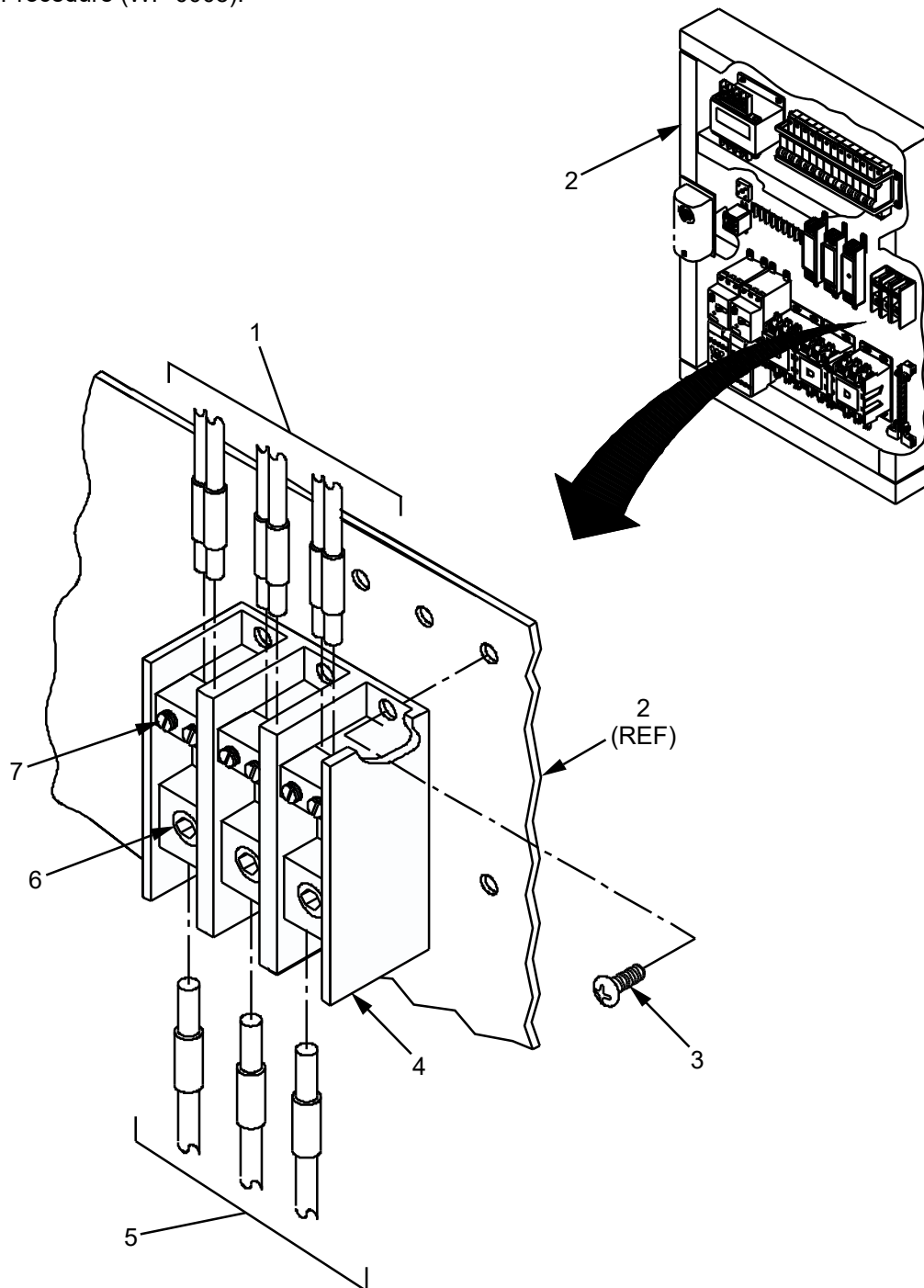


Figure 3. Power Distribution Block Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CUT-OFF SWITCHES MAINTAINER MAINTENANCE

GENERAL

This work package provides information on removal and replacement of the following components on the ECU:

- High temperature cut-off switch (HTC)
- High Pressure cut-off switch
- Low Pressure cut-off switch

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected. Failure to comply with this warning could result in electrical shock or death to the individual.

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

REFRIGERANT UNDER PRESSURE

Death or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part of the system that contains refrigerant. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams for ECU.

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

ECU HIGH TEMPERATURE CUT-OFF (HTC) SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Multimeter (WP 0132, Table 2, Item 2)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

HTC Switch

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

The high temperature cut-off (HTC) switch is located on the blower assembly frame near the evaporator blower motor.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel (Figure 1, Item 1) from ECU and set aside.
3. Mark and disconnect two terminals (38A and 39A) (Figure 1, Item 3) from high temperature cut-off switch (HTC) (Figure 1, Item 4).
4. Rotate high temperature cut-off switch (Figure 1, Item 4) until tabs (Figure 1, Item 2) align with notches and remove high temperature cut-off switch (Figure 1, Item 4).

END OF TASK**REPLACEMENT****NOTE**

If necessary, refer to Fold Out Pages/wiring diagrams of ECU.

1. Align notches in temperature cut-off switch (Figure 1, Item 4) with tabs (Figure 1, Item 2) in mount and insert. Twist temperature cut-off switch (Figure 1, Item 4) until it is locked into place.
2. Connect two terminals (38A and 39A) (Figure 1, Item 3) to temperature cut-off switch (Figure 1, Item 4).
3. Replace access panel (Figure 1, Item 1).
4. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

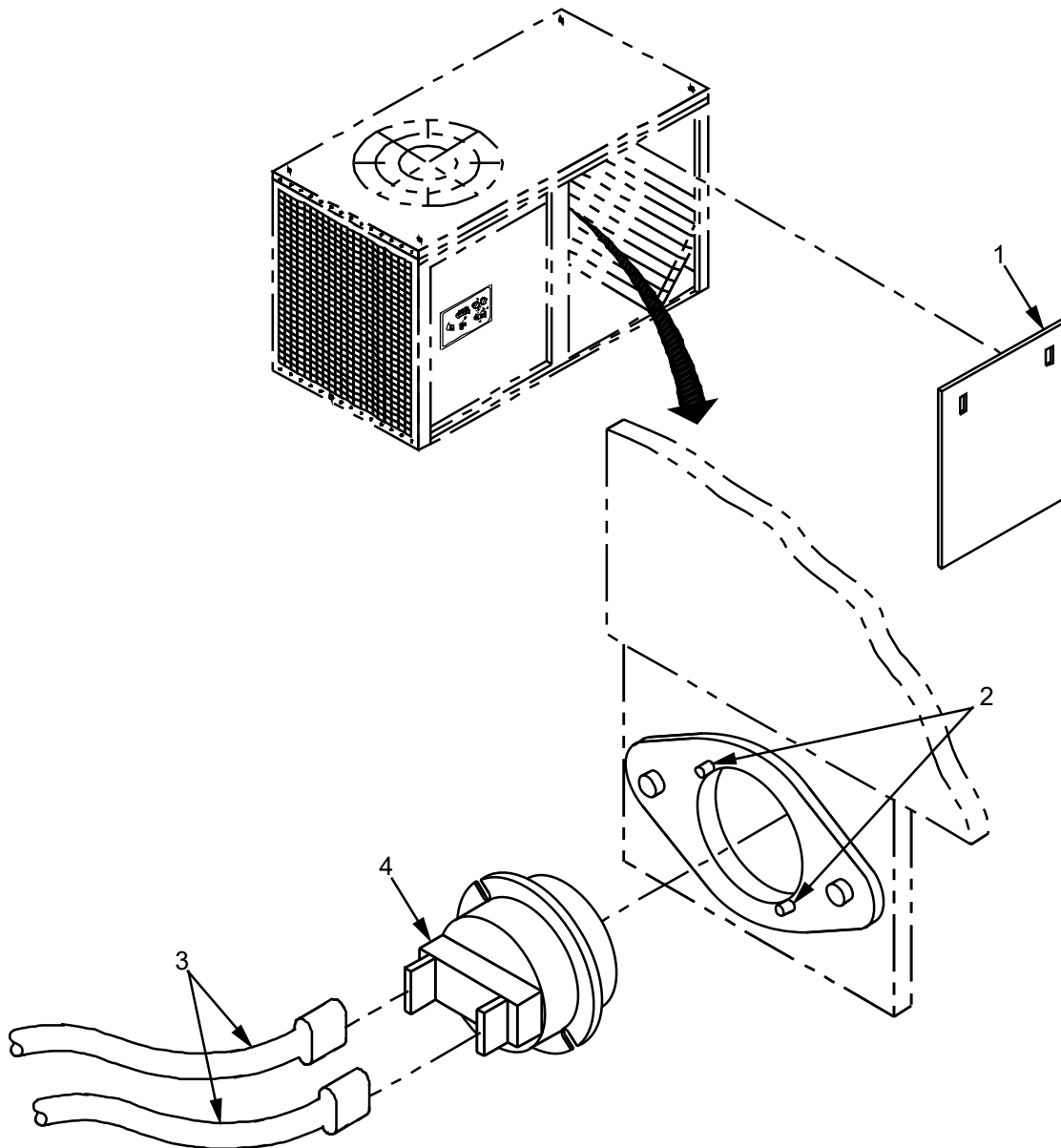


Figure 1. High Temperature Cut-off Switch (HTC) Replace.

END OF TASK

ECU HIGH PRESSURE CUT-OFF SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)
High Pressure Cutoff Switch

References

WP 0005, WP 0045, WP 0113,
WP 0115, WP 0116

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties

The high pressure cut-off switch is located near the condenser coil.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel (Figure 2, Item 1) from ECU and set aside.
3. Recover refrigerant as described in WP 0116.
4. Mark and disconnect two terminals (43B and 44A) (Figure 2, Item 4) from high pressure cut-off switch electrical connection (Figure 2, Item 3) and set aside.
5. Debraze mounting joint as described in WP 0115 and remove high pressure cut-off switch (Figure 2, Item 2).

END OF TASK**REPLACEMENT****WARNING**

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

1. Install high pressure cut-off switch (Figure 2, Item 2) and braze mounting joint as described in WP 0115.
2. Connect two terminals (43B and 44A) (Figure 2, Item 4) from wiring harness to high pressure cut-off switch electrical connection (Figure 2, Item 3) and cover with appropriate insulation.
3. Replace filter/dryer as described in WP 0113.
4. Leak test as described in WP 0116.
5. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0116.
6. Replace access panel (Figure 2, Item 1).
7. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

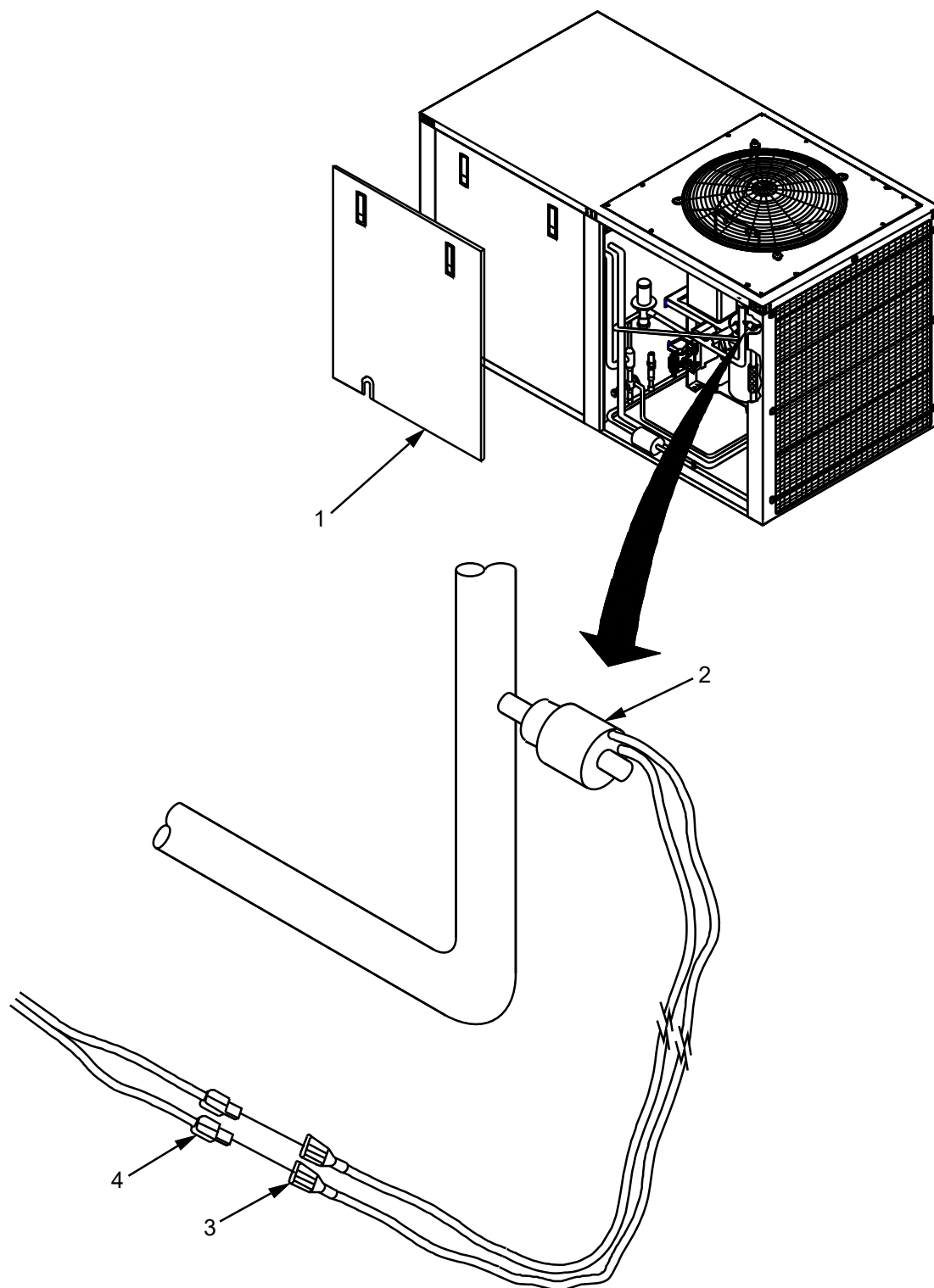


Figure 2. High Pressure Cut-Off Switch Replace.

END OF TASK

ECU LOW PRESSURE CUT-OFF SWITCH REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)
Low Pressure Cutoff Switch

References

WP 0005, WP 0045, WP 0113,
WP 0116

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel (Figure 3, Item 1) from ECU and set aside.
3. Recover refrigerant as described in WP 0116.

REMOVAL - Continued

4. Mark and disconnect two terminals (41C and 43A) (Figure 3, Item 3) from low pressure cut-off switch electrical connection (Figure 3, Item 4) and set aside.
5. Unscrew low pressure cut-off switch (Figure 3, Item 2) and remove.

END OF TASK**REPLACEMENT****NOTE**

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties

1. Install low pressure cut-off switch (Figure 3, Item 2) and tighten.
2. Connect two terminals (41C and 43A) (Figure 3, Item 3) from wiring harness to low pressure cut-off switch electrical connection (Figure 3, Item 4).
3. Replace filter/drier as described in WP 0113.
4. Leak test as described in WP 0116.
5. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0116.
6. Replace access panel (Figure 3, Item 1).
7. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

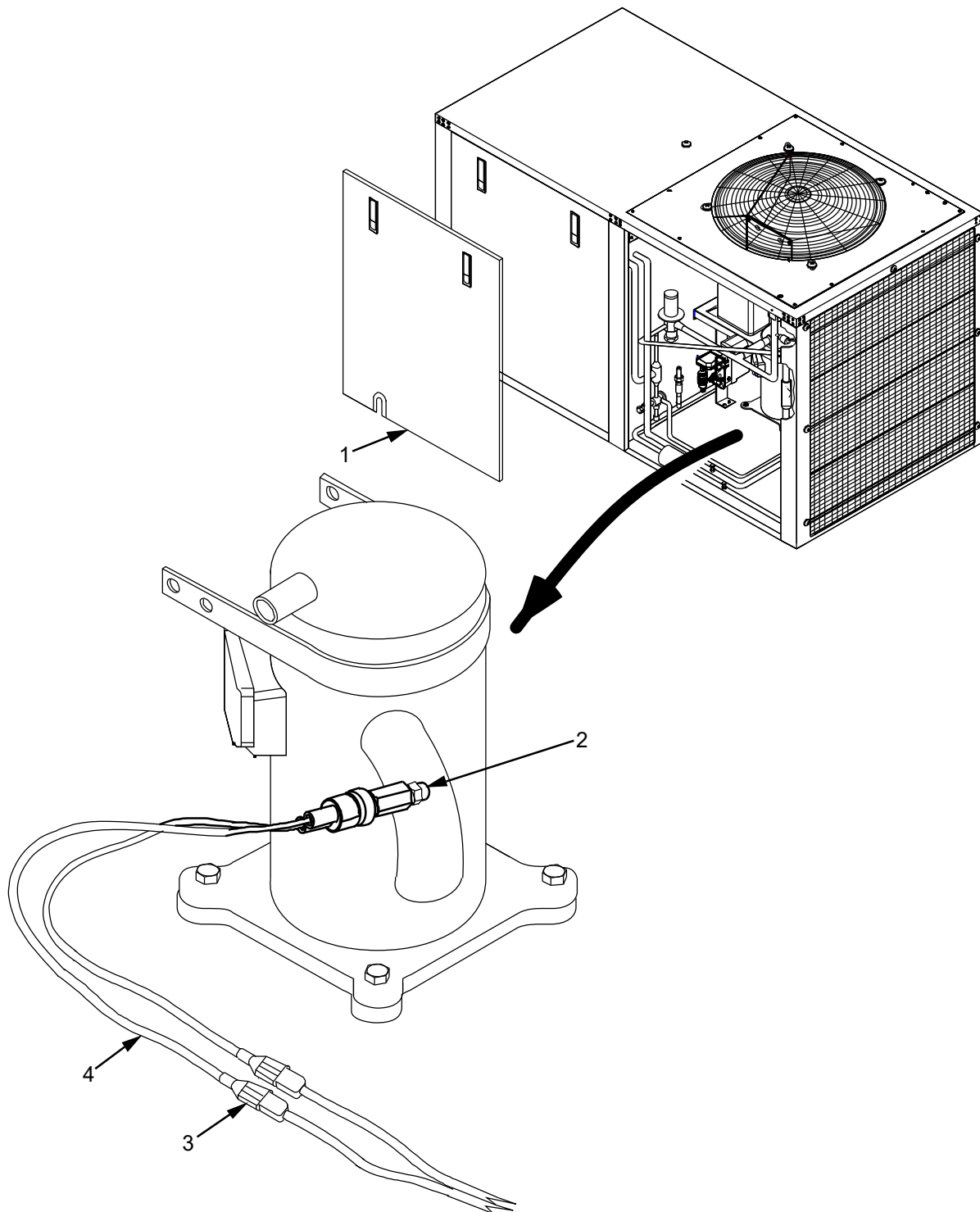


Figure 3. Low Pressure Cut-Off Switch Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU VALVES MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU control panel. They consist of:

- Thermal expansion valve (TEV) removal/replacement/adjustment
- Quench valve removal/replacement
- Hot-gas bypass valve removal/replacement/adjustment
- High pressure relief removal/replacement
- Solenoid valve removal/replacement

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams of the ECU.

ECU THERMAL EXPANSION VALVE (TEV) REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)
Face shield

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)
Thermal expansion valve

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0045, WP 0113,
WP 0115, WP 0116

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel from ECU and set aside.
3. Remove insulation (Figure 1, Item 1) from thermal expansion valve (Figure 1, Item 2), sensing bulb (Figure 1, Item 3), and surrounding pipes to safely allow brazing.
4. Recover refrigerant as described in WP 0116.
5. Wrap wet rag around thermal expansion valve (Figure 1, Item 2), distribution tube (Figure 1, Item 5), and capillary tubes (Figure 1, Item 4), to prevent damage from overheating.
6. Debraze TEV (Figure 1, Item 2) at brazing points (see Figure 1). If necessary, refer to WP 0115 for brazing procedures.
7. Remove and retain any copper hose clamps securing sensing bulb (Figure 1, Item 3) to surrounding pipes.
8. Remove TEV (Figure 1, Item 2), sensing bulb (Figure 1, Item 3) and associated tubing.

END OF TASK**REPLACEMENT****WARNING**

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams of the ECU.

1. Install TEV (Figure 1, Item 2), sensing bulb (Figure 1, Item 3) and associated tubing.
2. Wrap wet rag around thermal expansion valve (Figure 1, Item 2), distribution tube (Figure 1, Item 5), and capillary tube (Figure 1, Item 4), to prevent damage from overheating.
3. Braze TEV at brazing points (see Figure 2). If necessary, refer to WP 0115 for brazing procedures.
4. Run sensing bulb (Figure 1, Item 3) to suction line of evaporator coil clamping into place as required with clamps removed earlier.

REPLACEMENT - Continued**NOTE**

Sensing bulb must be insulated to avoid thermal contamination from ambient air.

5. Install insulation (Figure 1, Item 1) onto sensing bulb (Figure 1, Item 3) and surrounding pipes.
6. Remove wet rag from around TEV (Figure 1, Item 2).
7. Replace filter/dryer as described in WP 0113.
8. Leak test as described in WP 0116.
9. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0116.
10. Replace access panel.
11. Perform adjustment procedure as described below.

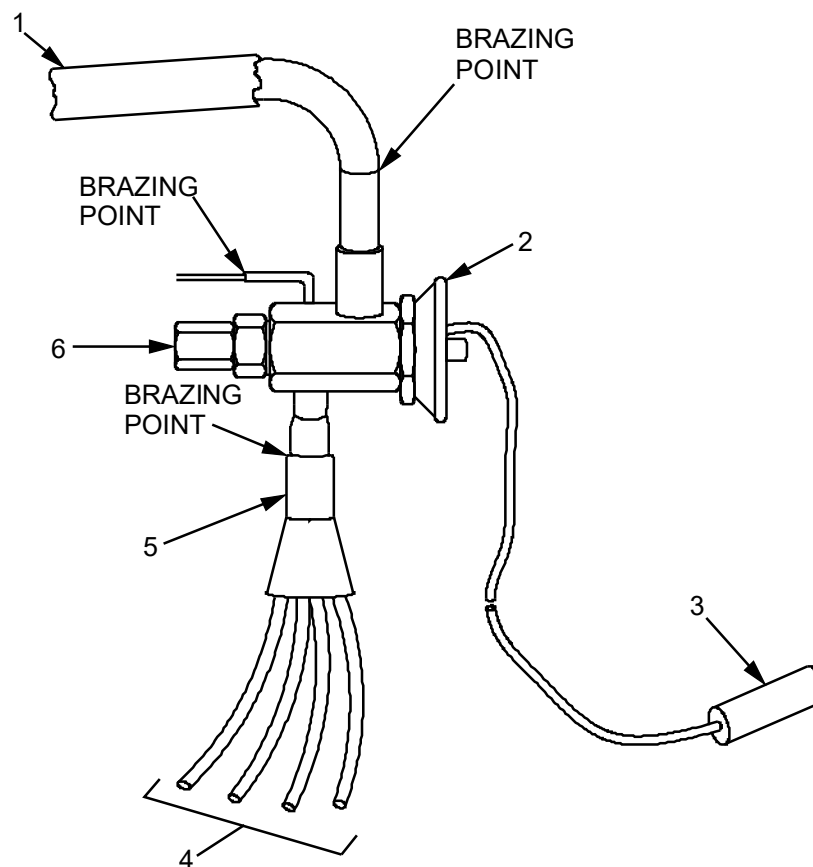


Figure 1. TEV Replace.

END OF TASK

ECU THERMAL EXPANSION VALVE SUPERHEAT ADJUSTMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)
/face shield

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)

Personnel Required

Utilities Equipment Repairer,
MOS 91C (1)

References

WP 0005, WP 0045

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

ADJUSTMENT**NOTE**

Return (ambient) air must be above 70°F (21.11°C).

1. Verify that all access panels on ECU are properly installed.
2. Attach red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
3. Verify that all duct work or covers are properly installed.
4. Place thermocouple wire near expansion sensing bulb (Figure 1, Item 3) (near discharge of the evaporator coil) and secure into place with tape.
5. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).
6. Set MODE SELECT to COOL and adjust TEMPERATURE to 70°F (21.11°C) and allow unit to stabilize (approx. 30 min).

NOTE

R-407C has glide. Low pressure gauge will modulate, use mean pressure reading.

7. Read low pressure gauge and convert gauge pressure to temperature using dew point column on refrigerant chart for R-407C.

ECU THERMAL EXPANSION VALVE SUPERHEAT ADJUSTMENT – Continued

8. Subtract dew point temperature from the thermocouple temperature. The resulting temperature difference is the super heat value. The resultant (the super heat value) should be between 7 and 12.
9. If resultant is NOT between 7 and 12:
 - a) Remove cap (Figure 1, Item 6) from end of TEV (Figure 1, Item 2).
 - b) Hold nut on TEV with 7/8" wrench.
 - c) If below 7, turn adjustment screw 1/2 turn clockwise.
 - d) Above 12, turn adjustment screw 1/2 turn counter-clockwise.
 - e) Allow system to stabilize (approx. 10 min.)
 - f) Recalculate superheat as described in steps 7 and 8.
10. Replace cap (Figure 1, Item 6) on TEV (Figure 1, Item 2) and remove thermocouple wire.
11. Disconnect red gauge/line from LIQUID HIGH PRESSURE and blue gauge/line from SUCTION LOW PRESSURE and replace caps.
12. Replace access panel.
13. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

END OF TASK

ECU QUENCH VALVE REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)
/face shield

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)
Quench valve

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0045, WP 0113,
WP 0115, WP 0116

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005) Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel from ECU and set aside.
3. Remove insulation (Figure 2, Item 4) from quench valve (Figure 2, Item 1), sensing bulb (Figure 2, Item 3), and surrounding pipes to safely allow brazing.
4. Recover refrigerant as described in WP 0116.
5. Debraze quench valve (Figure 2, Item 1) at brazing points (see Figure 2). If necessary, refer to WP 0115 for brazing procedures.
6. Remove and retain any copper hose clamps securing distribution tube (Figure 2, Item 2) and sensing bulb (Figure 2, Item 3) to surrounding pipes.
7. Remove quench valve (Figure 2, Item 1) distribution tube (Figure 2, Item 2) and sensing bulb (Figure 2, Item 3).

END OF TASK**REPLACEMENT****CAUTION**

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams of the ECU.

1. Install quench valve (Figure 2, Item 1).
2. Wrap wet rag around quench valve (Figure 2, Item 1), distribution tube (Figure 2, Item 2), and sensing bulb (Figure 2, Item 3) to prevent damage from overheating.
3. Braze quench valve (Figure 2, Item 1) into place. If necessary, refer to WP 0115 for brazing procedures.
4. Run distribution tube (Figure 2, Item 2) and sensing bulb (Figure 2, Item 3) to suction line of evaporator coil clamping into place as required.
5. Install insulation (Figure 2, Item 4) onto sensing bulb (Figure 2, Item 3) and surrounding pipes.

REPLACEMENT – Continued

6. Remove wet rag from around quench valve (Figure 2, Item 1).
7. Replace filter/dryer as described in WP 0113.
8. Leak test as described in WP 0116.
9. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0115.
10. Replace access panel.
11. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

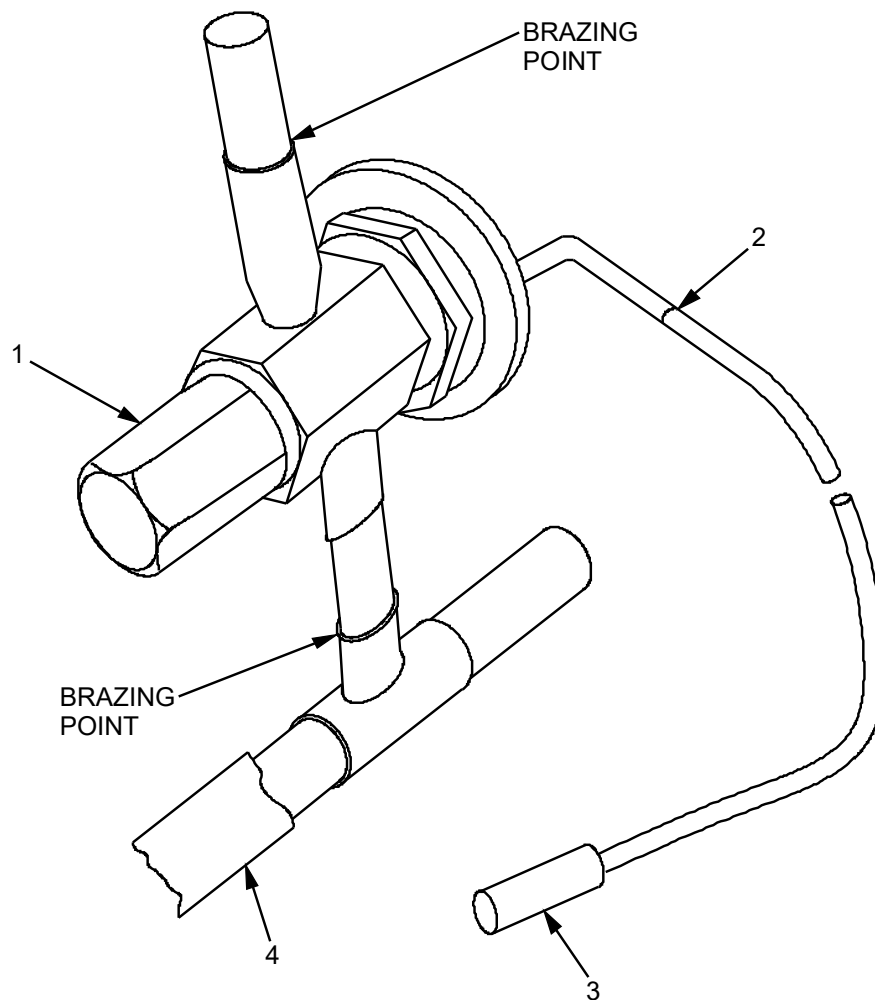


Figure 2. Quench Valve Replace.

END OF TASK

ECU HOT GAS BYPASS VALVE REMOVAL/REPLACEMENT/ADJUSTMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)
/face shield

Materials/Parts

Hot gas by-pass valve
Gloves, rubber (WP 0180, Table 1, Item 17)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0045, WP 0113,
WP 0115, WP 0116

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel from ECU and set aside.
3. Remove insulation (Figure 3, Item 3) from hot gas by-pass valve (Figure 3, Item 1), and surrounding pipes to safely allow brazing.
4. Recover refrigerant as described in WP 0116.
5. Debraze hot gas by-pass valve (Figure 3, Item 1) at brazing points (see Figure 3). If necessary, refer to WP 0115 for brazing procedures.
6. Remove hot gas by-pass valve (Figure 3, Item 1).

END OF TASK**REPLACEMENT****CAUTION**

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams of the ECU.

1. Install hot gas by-pass valve (Figure 3, Item 1).
2. Braze hot gas by-pass (Figure 3, Item 1) into place. If necessary, refer to WP 0115 for brazing procedures.
3. Install insulation (Figure 3, Item 3) onto hot gas by-pass valve (Figure 3, Item 1) and surrounding pipes.
4. Replace filter/dryer as described in WP 0113.
5. Leak test as described in WP 0116.
6. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0115.
7. Replace access panel.

REPLACEMENT – Continued

8. Perform adjustment procedure as described in this Work Package.

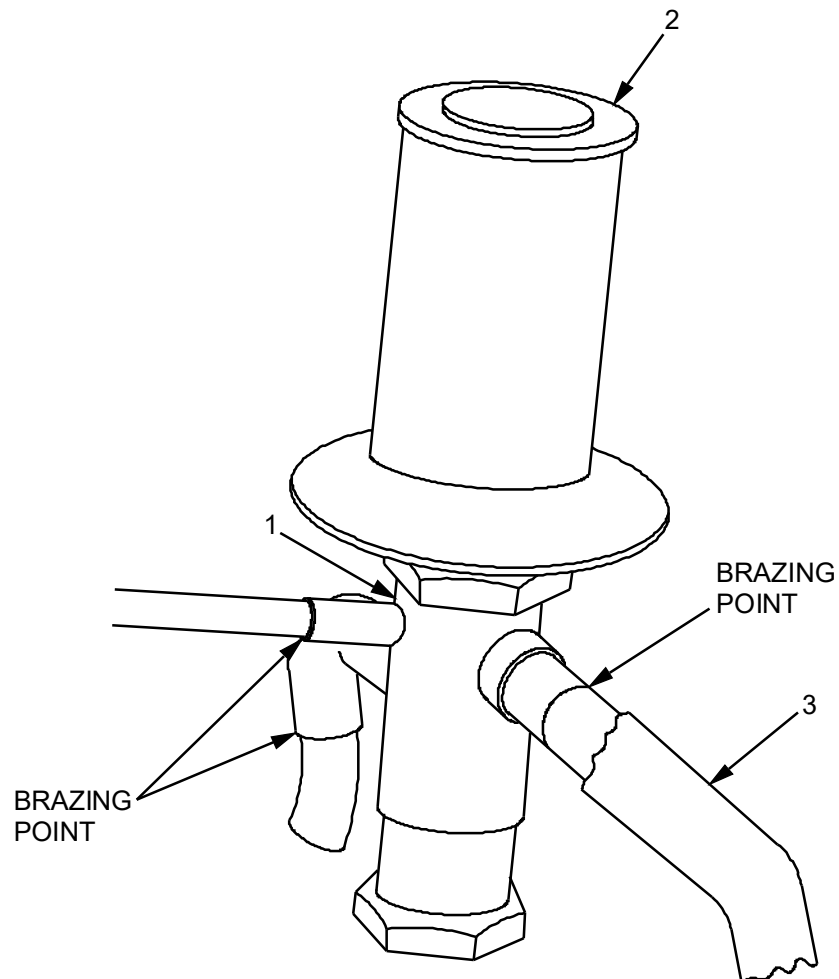


Figure 3. Hot Gas By-Pass Valve Replace.

END OF TASK

ADJUSTMENT

1. Verify that all access panels on ECU are properly installed.
2. Attach red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
3. Verify that all duct work or covers are properly installed.
4. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

NOTE

Once the following step has been completed, an audible whistle should be coming from the hot-gas by-pass valve.

5. Set MODE SELECT to COOL and adjust TEMPERATURE to maximum setting (110°F) (43.33°C) Low Pressure gauge should read 55 psig. If Low pressure gauge does not read 55 psig:
 - a) Remove cap (Figure 3, Item 2) from hot-gas by-pass valve.
 - b) If Low pressure gauge reading is ABOVE 55 psig adjust screw 1/2 turn counter-clockwise.
 - c) If Low pressure gauge reading is BELOW 55 psig adjust screw 1/2 turn clockwise.
 - d) Allow system to stabilize (approx. 10 minutes) and read low pressure gauge. If necessary, repeat until Low pressure gauge reads 55 psig.
6. Replace cap (Figure 3, Item 2) on hot gas by-pass valve (Figure 3, Item 1).
7. Adjust TEMPERATURE to 72°F (22.22°C). If setting is below return air temperature, solenoid valve will close and audible whistle will stop, head pressure and suction pressure will increase.
8. Disconnect red gauge/line from LIQUID HIGH PRESSURE and blue gauge/line from SUCTION LOW PRESSURE and replace caps.

END OF TASK

ECU HIGH PRESSURE RELIEF VALVE REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)
/face shield

Materials/Parts

High pressure relief valve
Sealing compound (WP 0180, Table 1, Item 37 & 38)
Gloves, rubber (WP 0180, Table 1, Item 17)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0045, WP 0113,
WP 0115, WP 0116

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel from ECU and set aside.
3. Recover refrigerant as described in WP 0116.
4. Remove any insulation from high pressure relief valve (Figure 4, Item 1) to allow removal.
5. Unscrew high pressure relief valve (Figure 4, Item 1) from plumbing joint (Figure 4, Item 2) and remove.

END OF TASK**REPLACEMENT****NOTE**

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams of the ECU.

1. Coat threaded joint with refrigerant grade Loctite.
2. Install high pressure relief valve (Figure 4, Item 1) into threaded plumbing joint (Figure 4, Item 2) and tighten.
3. Install any insulation removed to install high pressure relief valve (Figure 4, Item 1).
4. Replace filter/dryer as described in WP 0113.
5. Leak test as described in WP 0116.
6. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0115.
7. Replace access panel.
8. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

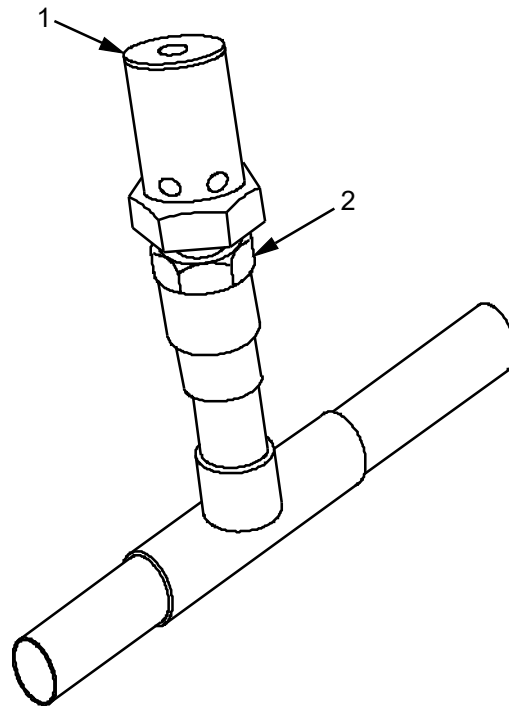


Figure 4. High Pressure Relief Valve Replace.

END OF TASK

ECU SOLENOID VALVE REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)
/face shield

Materials/Parts

Solenoid valve
Gloves, rubber (WP 0180, Table 1, Item 17)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0045, WP 0113,
WP 0115, WP 0116

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter must be replaced anytime there is a major component malfunction or the integrity of the system will be severely compromised.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel from ECU and set aside.
3. Recover refrigerant as described in WP 0116.
4. Remove any insulation (Figure 5, Item 2) from solenoid valve (Figure 5, Item 1), and surrounding pipes to allow brazing.
5. Remove and retain four bolts that secure ECU control panel to frame.

CAUTION

When performing the following step, be observant of wires, cables and thermostat sense line being fed into the ECU control panel. Do not damage, equipment or components.

6. Remove ECU control panel and lay face down out of the way.
7. Remove power head (Figure 5, Item 3) from solenoid valve (Figure 5, Item 1).
8. Debraze solenoid valve (Figure 5, Item 1) at brazing points (see Figure 5). If necessary, refer to WP 0115 for brazing procedures.
9. Mark and remove wires (33J and 42B) from power head (Figure 5, Item 3).

END OF TASK**REPLACEMENT****CAUTION**

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams of the ECU.

1. Connect wires (33J and 42B) to power head (Figure 5, Item 3).
2. Install solenoid valve (Figure 5, Item 1) and braze into place. If necessary, refer to WP 0115 for brazing procedures.

REPLACEMENT - continued

3. Install ECU control panel and secure with four bolts.
4. Replace filter/dryer as described in WP 0113.
5. Leak test as described in WP 0116.
6. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0115.
7. Install power head (Figure 5, Item 3) onto solenoid valve (Figure 5, Item 1).
8. Install any insulation onto solenoid valve (Figure 5, Item 2), and surrounding pipes.
9. Replace access panel.
10. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

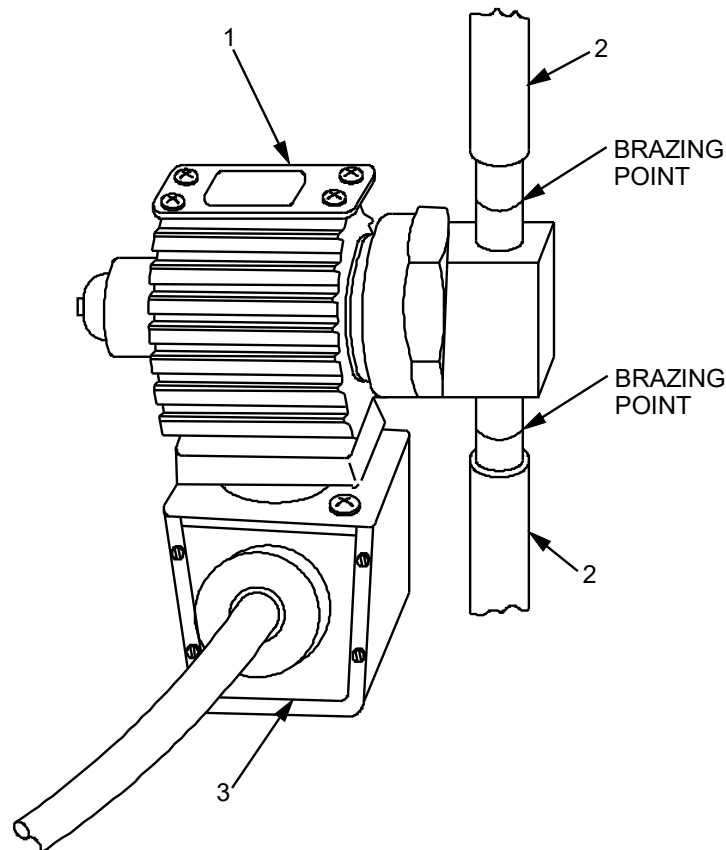


Figure 5. Solenoid Valve Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU AUXILIARY HEATER MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the ECU Auxiliary heater and its components. They consist of:

- Auxiliary heater removal/replacement.
- Auxiliary heater fuel pump and fuel filter removal/replacement.
- Auxiliary heater hoses removal/replacement.
- Auxiliary heater fuse removal/replacement.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the ECU.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of HP-2C/185 UST Trailer.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

ECU AUXILIARY HEATER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Materials/Parts

Auxiliary heater

Drain pan

Cloth, cleaning (WP 0180, Table 1, Item 12)

Gloves, Rubber (WP 0180, Table 1, Item 17)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0021

Equipment Condition

ECU Shut Down

Power Source – Off

ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Do not enter ECU with ECU operating or power applied. Damage to equipment or serious injury to personnel may result.

REMOVAL

1. Verify that ECU (Figure 1, Item 1) has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove front and rear access panels (Figure 1, Item 2) and set aside.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of the HP-2C/185 UST Trailer.

3. Loosen hose clamp (Figure 1, Item 8) on Auxiliary heater fuel line (Figure 1, Item 7) at the fuel pump (Figure 1, Item 9) and disconnect fuel line (Figure 1, Item 7). Guide fuel line (Figure 1, Item 7) to spill bucket and allow fuel to drain out of system.
4. Loosen hose clamp (Figure 1, Item 6) that secures cool fluid input hose (Figure 1, Item 10) on the Auxiliary heater body (Figure 1, Item 3) and disconnect cool fluid input hose (Figure 1, Item 10).

REMOVAL - Continued

5. Loosen spring clamp (Figure 1, Item 14) that secures fresh air intake hose (Figure 1, Item 13) to the Auxiliary heater body (Figure 1, Item 3). Remove fresh air intake hose (Figure 1, Item 13) from the Auxiliary heater body (Figure 1, Item 3).
6. Loosen spring clamp (Figure 1, Item 12) that secures hot output hose (Figure 1, Item 11) to the Auxiliary heater body (Figure 1, Item 3). Remove hot output hose (Figure 1, Item 11) from the heater body.
7. Loosen spring clamp (Figure 1, Item 4) that secures exhaust hose (Figure 1, Item 5). Remove exhaust hose (Figure 1, Item 5) from the Auxiliary heater body (Figure 1, Item 3).
8. Remove and retain three nuts (Figure 1, Item 15) and washers (Figure 1, Item 16) that secure Auxiliary heater body (Figure 1, Item 3) to Auxiliary heater tank mounting bracket (Figure 1, Item 17).
9. Remove the Auxiliary heater body (Figure 1, Item 3) from the ECU enclosure.

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
 - Inspect Auxiliary heater fuel filter. Ensure that fuel filter is not excessively dirty, worn, or is in other need of servicing.
 - Inspect Auxiliary heater fuel pump. Ensure that fuel pump is not excessively damaged or otherwise appears to be unserviceable.
1. Align Auxiliary heater body (Figure 1, Item 3) with proper holes on Auxiliary heater tank mounting bracket (Figure 1, Item 17) and secure using three nuts (Figure 1, Item 15) and washers (Figure 1, Item 16).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when ECU is hot. Fuel can be ignited by hot ECU. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of HP-2C/185 UST Trailer.

2. Connect Auxiliary heater fuel line (Figure 1, Item 7) to fuel pump (Figure 1, Item 9). Secure with hose clamp (Figure 1, Item 8).
3. Connect cool fluid input hose (Figure 1, Item 10) to proper port on Auxiliary heater body (Figure 1, Item 3). Secure with hose clamp (Figure 1, Item 6).
4. Connect fresh air intake hose (Figure 1, Item 13) to proper port on Auxiliary heater body (Figure 1, Item 3). Secure with spring clamp (Figure 1, Item 14).

REPLACEMENT - Continued

5. Connect exhaust hose (Figure 1, Item 5) to proper port on Auxiliary heater body (Figure 1, Item 3) and secure with spring clamp (Figure 1, Item 4).
6. Connect hot output hose (Figure 1, Item 11) to the Auxiliary heater body (Figure 1, Item 3). Secure with spring clamp (Figure 1, Item 12).
7. Check and refill coolant level in accordance with WP 0021.
8. Clean up any excess spillage from base of ECU.
9. Install and secure front and rear access panels (Figure 1, Item 2).
10. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

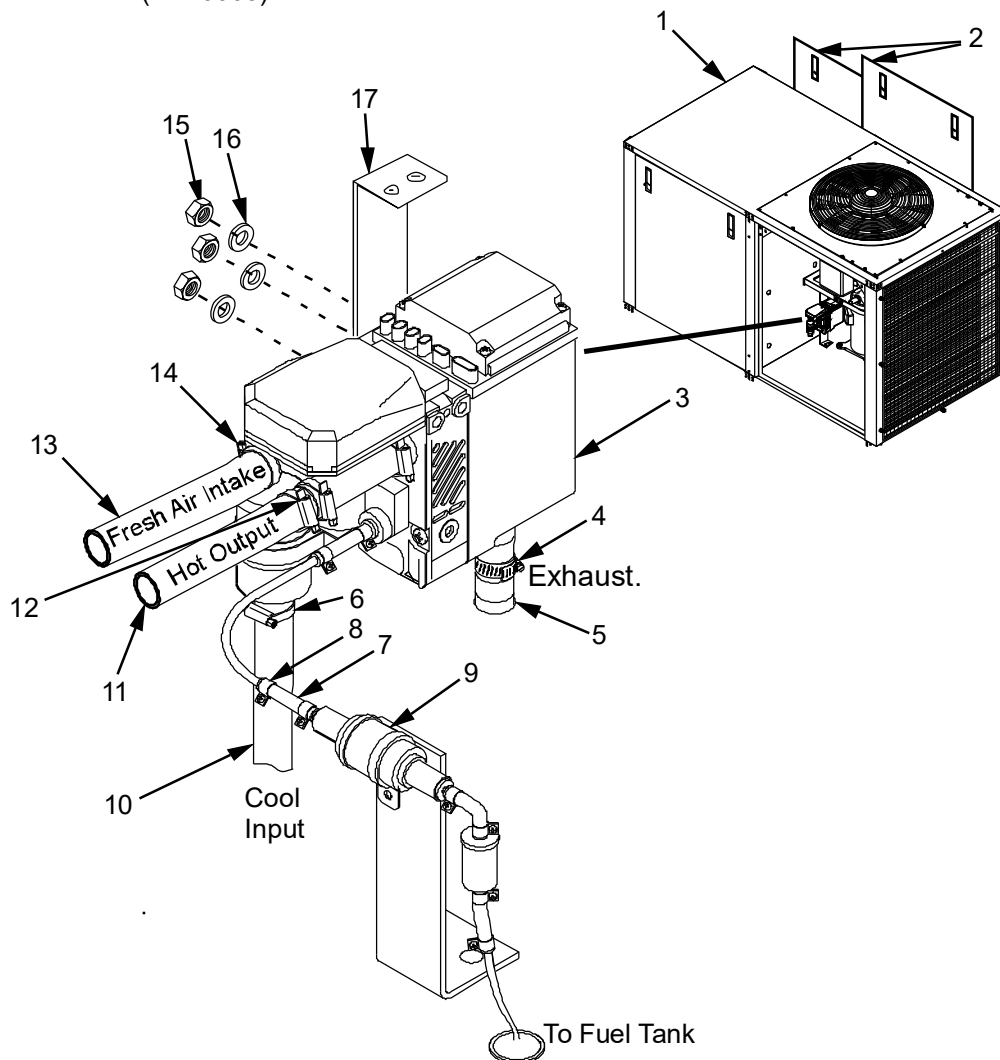


Figure 1. Auxiliary Heater Replace.

END OF TASK

ECU AUXILIARY HEATER FUEL PUMP AND FUEL FILTER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredUtilities Equipment Repairer,
MOS 91C (1)**Materials/Parts**Fuel pump
Fuel filter
Drain pan
Cloth, cleaning (WP 0180, Table 1, Item 12)
Gloves, Rubber (WP 0180, Table 1, Item 17)**References**

WP 0005

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Do not enter ECU with ECU operating or power applied. Damage to equipment or serious injury to personnel may result.

FUEL PUMP**REMOVAL**

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Disconnect the ECU power cable from the Power Source.
3. Unlatch and remove rear access panel (Figure 2, Item 1) and set aside.
4. Disconnect electrical cable (Figure 2, Item 16) from fuel pump (Figure 2, Item 4).

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of HP-2C/185 UST Trailer.

5. Loosen hose clamp (Figure 2, Item 3) and disconnect fuel line (Figure 2, Item 2) (Auxiliary heater side) from fuel pump (Figure 2, Item 4). Guide fuel line (Figure 2, Item 2) to spill bucket and allow fuel to drain.

REMOVAL - Continued

6. Loosen second hose clamp (Figure 2, Item 8) and disconnect fuel line (Figure 2, Item 9) (filter side) from fuel pump (Figure 2, Item 4).
7. Remove and retain screw (Figure 2, Item 6), flat washer (Figure 2, Item 7), and nut (Figure 2, Item 15), that secures fuel pump (Figure 2, Item 4) and clamp (Figure 2, Item 5) to bracket (Figure 2, Item 14).
8. Remove fuel pump (Figure 2, Item 4) and clamp (Figure 2, Item 5).

END OF TASK**REPLACEMENT****NOTE**

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect Auxiliary heater fuel filter. Ensure that fuel filter is not excessively dirty, worn or is in other need of servicing.

When performing the following steps verify that fuel pump (Figure 2, Item 3) is installed in the proper direction. Arrow should point towards fuel line going to Auxiliary heater.

1. Install clamp (Figure 2, Item 5) onto fuel pump (Figure 2, Item 4). Secure assembly to bracket (Figure 2, Item 14) with screw (Figure 2, Item 6), flat washer (Figure 2, Item 7), and nut (Figure 2, Item 15).
2. Connect fuel line (Figure 2, Item 9) (filter side) to fuel pump (Figure 2, Item 4) and secure with clamp (Figure 2, Item 8).
3. Connect fuel line (Figure 2, Item 2) (Auxiliary heater side) to fuel pump (Figure 2, Item 4) and secure with hose clamp (Figure 2, Item 3).
4. Connect electrical cable (Figure 2, Item 16) to fuel pump (Figure 2, Item 4).
5. Clean up any excess spillage from base of ECU.
6. Install and secure front and rear access panels (Figure 2, Item 1).
7. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

END OF TASK

FUEL FILTER

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Disconnect the ECU power cable from the Power Source.
3. Unlatch and remove access panel (Figure 2, Item 1) and set aside.

WARNING

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of HP-2C/185 UST Trailer.

4. Loosen hose clamp (Figure 2, Item 10) and disconnect fuel line (Figure 2, Item 9) (fuel pump side) from fuel filter (Figure 2, Item 11).

NOTE

When performing the following step do not let fuel line fall through frame.

5. Loosen second hose clamp (Figure 2, Item 12) and disconnect fuel filter (Figure 2, Item 11) from fuel line (Figure 2, Item 13) (fuel tank side).

END OF TASK

REPLACEMENT

NOTE

Prior to performing the following steps:

- Inspect all clamps and hoses. Ensure that hoses are not damaged (cuts, nicks, etc.). Ensure that all hoses are not excessively worn or appear to be unserviceable. Ensure that clamps are in good working order.
- Inspect Auxiliary heater fuel pump. Ensure that fuel pump is not excessively damaged or otherwise appears to be unserviceable.

When performing the following steps verify that fuel filter (Figure 2, Item 11) is installed in the proper direction. Arrow should point towards fuel line going to Auxiliary heater.

1. Connect fuel filter (Figure 2, Item 11) to fuel line (Figure 2, Item 13) (fuel tank side) and secure with hose clamp (Figure 2, Item 12).
2. Connect fuel line (Figure 2, Item 9) (fuel pump side) to fuel filter (Figure 2, Item 11) and secure with hose clamp (Figure 2, Item 10).

REPLACEMENT - Continued

3. Clean up any excess spillage from base of ECU.
4. Install and secure access panel (Figure 2, Item 1).
5. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

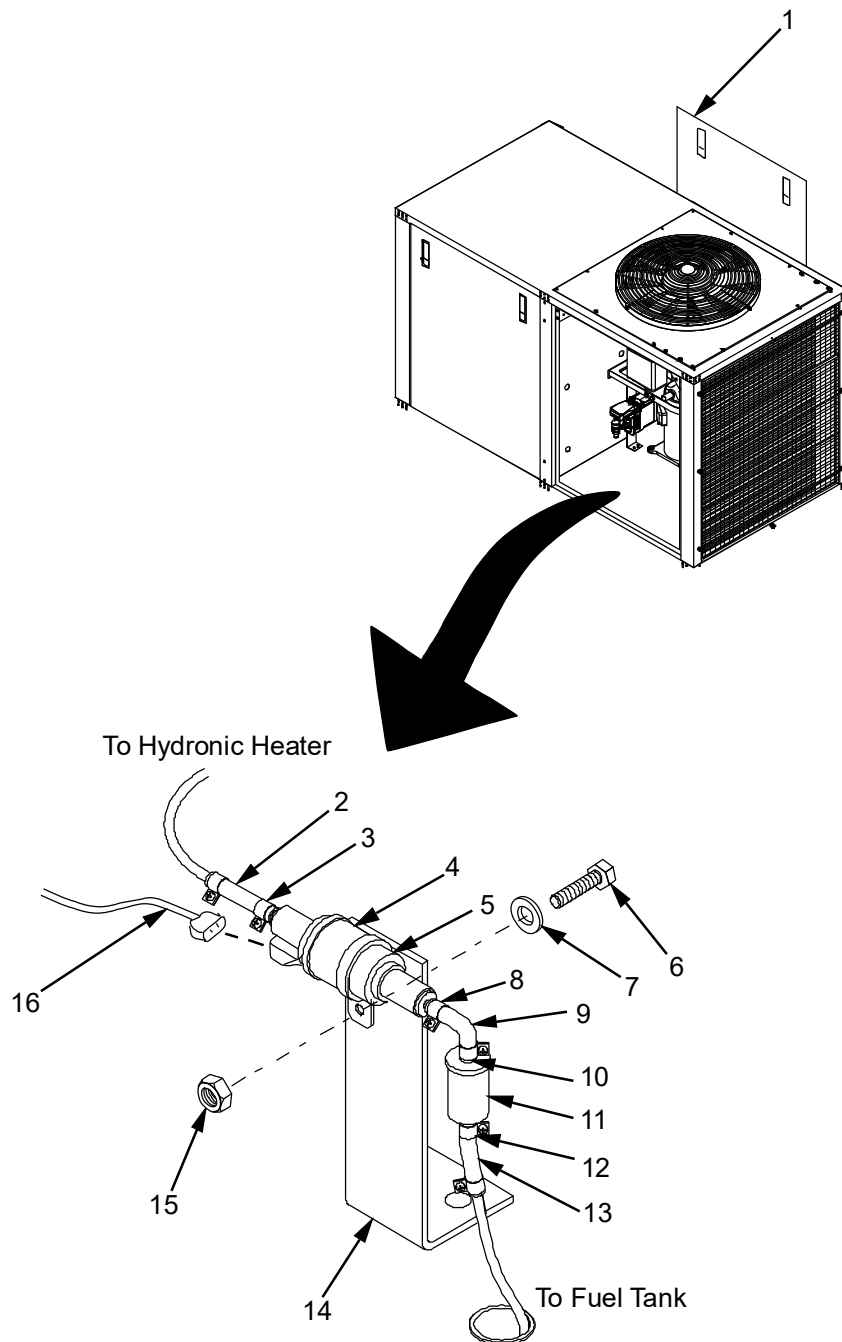


Figure 2. Auxiliary Heater Fuel Pump and Fuel Filter Replace.

END OF TASK

ECU AUXILIARY HEATER HOSE REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)

Materials/Parts

Auxiliary heater hoses

Drain pan

Cloth, cleaning (WP 0180, Table 1, Item 12)

Gloves, Rubber (WP 0180, Table 1, Item 17)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0021

Equipment Condition

ECU Shut Down

Power Source – Off

ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Do not enter ECU with ECU operating or power applied. Damage to equipment or serious injury to personnel may result.

REMOVAL

1. Verify that ECU (Figure 3, Item 1) has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove front and rear access panels (Figure 3, Item 2) and set aside. Identify hose to be replaced, air (Figure 3, Item 6), fuel (Figure 3, Item 4), coolant (Figure 3, Item 5) or exhaust (Figure 3, Item 3).

NOTE

When coolant hoses are disconnected, the coolant reservoir will drain.
Drain coolant into a clean container to allow reuse.

3. Using either a flat tip screw driver or the appropriate socket and ratchet, loosen the hose clamps on both ends of the hose to be replaced.
4. Place a drip bucket or absorbent pad under the connection to be broken in case of spillage.
5. Grasp the hose with hands or a pair of pliers and rotate the hose close to the connection to break the connection.
6. Pull the hose away from the connection using a twisting motion until it comes free.
7. Repeat steps 4 through 6 to remove the other end of the hose.

REMOVAL - Continued

8. Remove the hose clamps if they are to be reused and discard hose.

END OF TASK**REPLACEMENT****NOTE**

Ensure that replacement hose is the same length and diameter of the original hose.

1. Place hose clamps onto replacement hose loosely and slide to center of hose.

NOTE

Ensure that the hose clamps are placed on the hose in such a way that the screws will be accessible once slid into place.

2. Most connections have a ridge built into them to facilitate a good seal when the hose clamp is tightened down. Identify the location of the ridge on the first side.
3. Using a twisting motion slide the hose onto the first connection. Ensure hose is slid back far enough.
4. Slide hose clamp down into position.
5. Repeat steps 2 through 4 for other end of hose.
6. Ensure hose is not twisted.
7. Tighten down hose clamps using flat tip screwdriver or socket and ratchet, until hose clamp begins to press into hose.

NOTE

Over tightening the hose clamp can result in damage to the hose and premature failure.

If replacing coolant hose, see WP 0021 to check and refill coolant levels.

8. Clean up any excess spillage from base of ECU.
9. Install and secure access panels (Figure 3, Item 2).
10. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

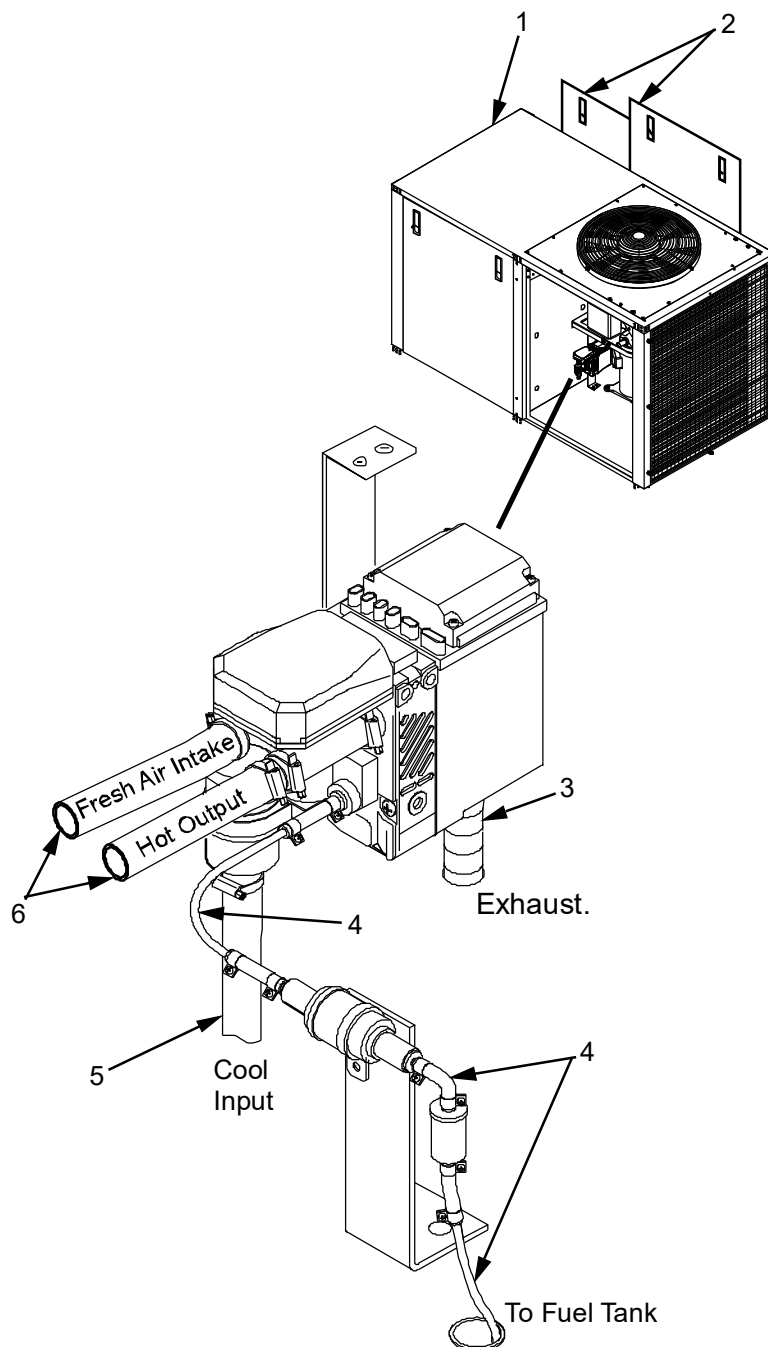


Figure 3. Auxiliary Heater Hose Replace.

END OF TASK

ECU AUXILIARY HEATER FUSE REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools****Materials/Parts**

Fuse

Personnel RequiredUtilities Equipment Repairer, MOS
91C (1)**References**

WP 0005

Equipment ConditionECU Shut Down
Power Source – Off
ECU Power cable disconnected from
Power Source

WARNING

High voltage and amperage present at electrical connections. Do not enter ECU with power applied. To prevent serious injury to personnel or damage to equipment, DO NOT enter enclosure with ECU operating.

REMOVAL

1. Verify that ECU (Figure 4, Item 1) has been shut down in accordance with ECU Shut Down Procedure (WP 0005)
2. Remove front access door (Figure 4, Item 2) on ECU and set aside.
3. Locate fuse holder (Figure 4, Item 6) on Auxiliary heater (Figure 4, Item 3) and open cover.
4. Identify and remove bad fuse (Figure 4, Items 4 or 5).

END OF TASK

REPLACEMENT

1. Replace fuse (Figure 4, Items 4 or 5) with proper type and value.
2. Close cover on fuse holder (Figure 4, Item 6).
3. Install access door (Figure 4, Item 2).
4. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

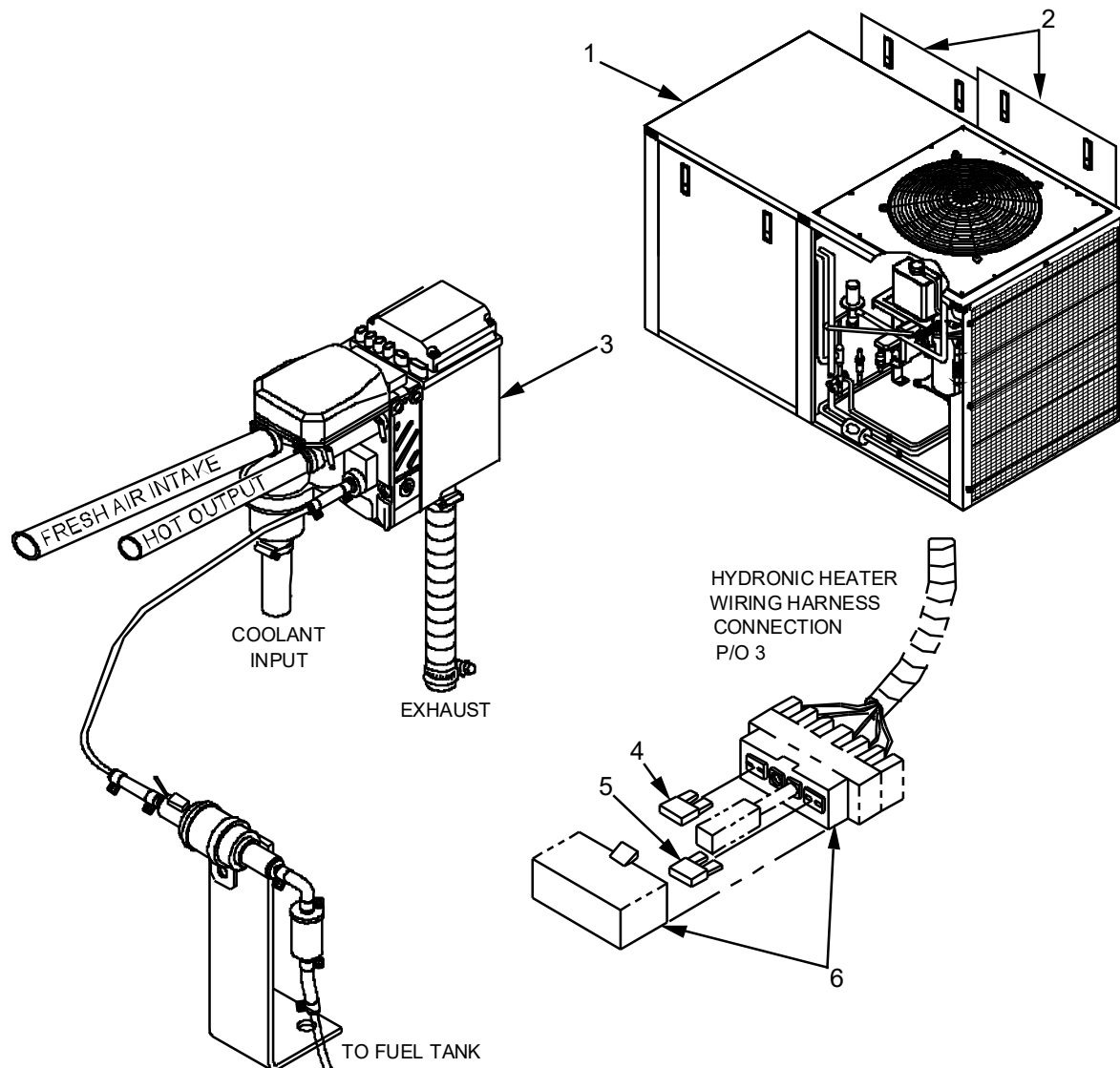


Figure 4. Auxiliary Heater Fuse Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU EVAPORATOR MOTOR MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU evaporator fan motor.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

NOTE

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages for ECU.

ECU EVAPORATOR MOTOR REMOVAL/REPLACEMENT/ADJUSTMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)
Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005

Materials/Parts

Evaporator Motor

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and power cable has been disconnected.
2. Open rear evaporator chamber access panel (Figure 1, Item 7) on ECU.
3. Loosen but do not remove four mounting nuts (Figure 1, Item 2), lock washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4) on evaporator fan motor mounting studs (Figure 1, Item 8).
4. Push the evaporator fan motor (Figure 1, Item 9) upwards along the mounting studs (Figure 1, Item 8) to decrease tension on belt (Figure 1, Item 11).
5. Slide belt (Figure 1, Item 11) off of evaporator motor pulley (Figure 1, Item 10) and blower pulley (Figure 1, Item 12).
6. Finish removing four nuts (Figure 1, Item 2), lock washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4).

CAUTION

When performing the following step, be observant of heater coils. Do not allow motor to damage heater coil. Electrical connections are still present on evaporator motor.

7. Remove evaporator motor (Figure 1, Item 9) from studs (Figure 1, Item 8) and turn to gain access to electrical connections.
8. Remove and retain two screws (Figure 1, Item 5) and cover (Figure 1, Item 6) on evaporator motor (Figure 1, Item 9) mark and disconnect electrical wiring.
9. Remove evaporator motor (Figure 1, Item 9) from ECU and set aside.

END OF TASK

REPLACEMENT

1. Remove and retain two screws (Figure 1, Item 5) and cover (Figure 1, Item 6) on evaporator motor (Figure 1, Item 9) and connect electrical wiring (see Table 1). Install cover and secure using two screws.

Table 1. Evaporator Motor Electrical Connections.

Wire Color	Motor Connection	Harness Connection (Wire #)
Green	Ground	11B
White	T1/T7	17
Red	T2/T8	16
Black	T3/T9	15
	T4/T5/T6	No Connection

2. Place evaporator motor (Figure 1, Item 9) onto mounting studs (Figure 1, Item 8) and loosely install four nuts (Figure 1, Item 2), lock washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4).

NOTE

Prior to performing the following step inspect evaporator motor belt.
Ensure that no visible damage is present.

3. Slide belt (Figure 1, Item 11) over evaporator motor pulley (Figure 1, Item 10) and blower pulley (Figure 1, Item 12).

NOTE

When performing the following steps, deflection of belt (Figure 1, Item 11) should not be greater than one inch.

4. Move evaporator fan motor (Figure 1, Item 9) to make proper tension adjustment to belt (Figure 1, Item 11).
 - Down to increase the tension on the evaporator motor belt (Figure 1, Item 11).
 - Up to decrease tension on the evaporator motor belt (Figure 1, Item 11).
5. Tighten four mounting nuts (Figure 1, Item 2), lock washers (Figure 1, Item 3), and flat washers (Figure 1, Item 4) on the evaporator fan motor mounting studs (Figure 1, Item 8).
6. Verify tension of evaporator motor belt (Figure 1, Item 11) as described in this WP.
7. Replace rear evaporator chamber access panel (Figure 1, Item 7).
8. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

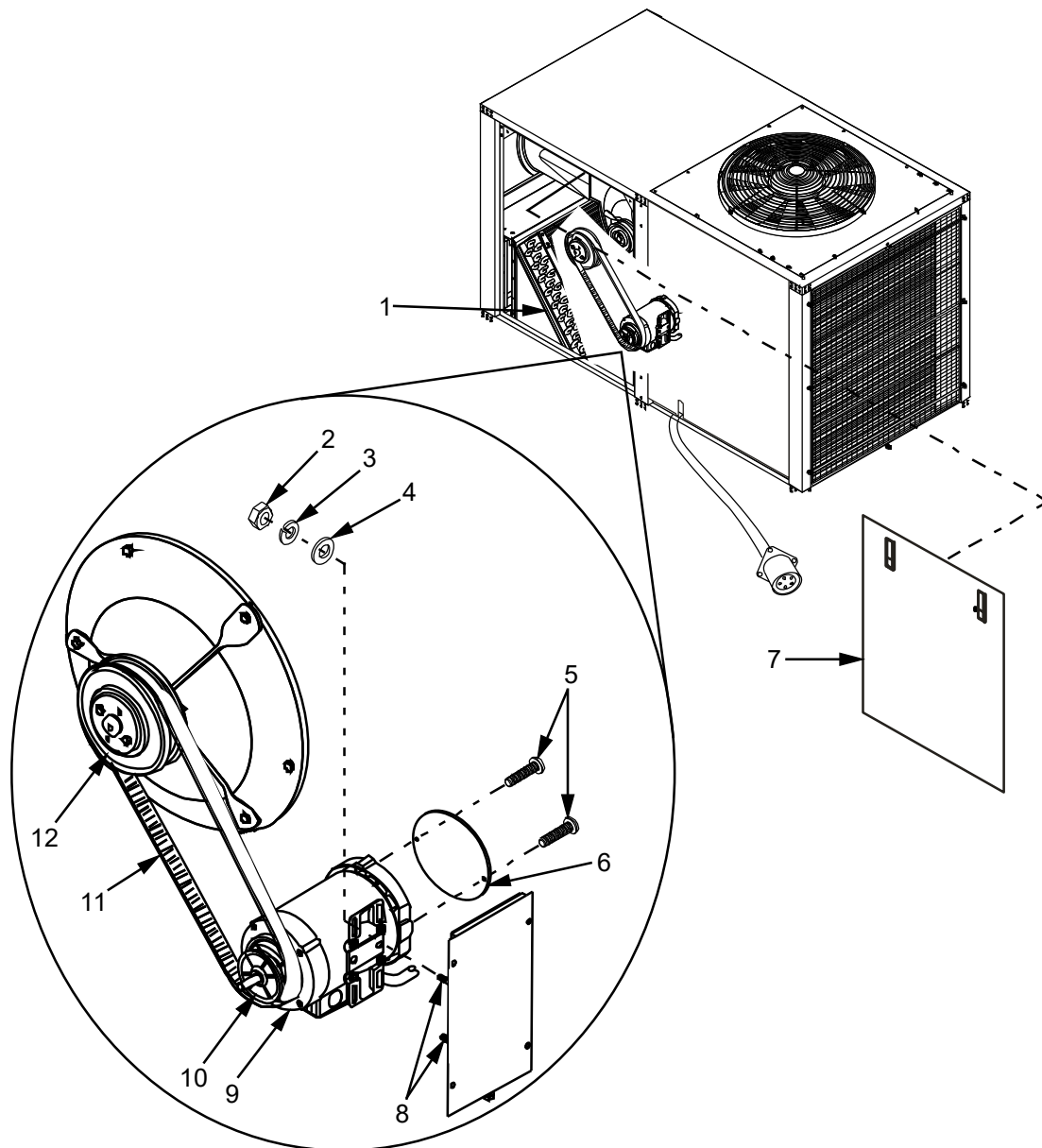


Figure 1. Evaporator Motor Replace.

END OF TASK

ECU EVAPORATOR BLOWER FAN REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)
Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Evaporator Blower Fan

References

WP 0005

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.

NOTE

If necessary, refer to procedure in this WP for steps 2 through 4.

2. Remove rear evaporator chamber access panel (Figure 1, Item 7) and set aside.
3. Loosen hardware that supports evaporator fan motor.
4. Push the evaporator fan motor upwards along the mounting studs to decrease tension on the belt (Figure 2, Item 7).
5. Slide belt (Figure 2, Item 7) off of blower pulley (Figure 2, Item 8).
6. Remove and retain three nuts (Figure 2, Item 10) and bolts (Figure 2, Item 11) that secure bearing supports (Figure 2, Item 4) onto bearing (Figure 2, Item 6).
7. Loosen but do not remove three bolts (Figure 2, Item 5) that secure brackets (Figure 2, Item 4) on control panel side of ECU.
8. Remove and retain three nuts (Figure 2, Item 10) and bolts (Figure 2, Item 11) that secure bearing supports (Figure 2, Item 4) on control panel side of ECU.
9. Loosen three bolts (Figure 2, Item 5) that secure bearing supports (Figure 2, Item 4) onto fan shroud (Figure 2, Item 3) and rotate bearing supports (Figure 2, Item 4) away from bearing (Figure 2, Item 6).
10. Remove and retain six mounting bolts (three loosened in previous step and three additional) (Figure 2, Items 5 and 12) that secure blower fan (Figure 2, Item 2) to enclosure (Figure 2, Item 1).

REMOVAL - Continued

11. Slide blower fan (Figure 2, Item 2) out and place on a suitable work area.
12. Remove set-screw (Figure 2, Item 14) and using a center puller, remove pulley assembly (Figure 2, Item 8) and key (Figure 2, Item 9) from shaft of blower fan (Figure 2, Item 2).
13. Remove set screw (Figure 2, Item 13) and shaft collar (Figure 2, Item 15) and set aside.
14. Remove and retain fan shroud (Figure 2, Item 3) and bearing supports (Figure 2, Item 4).

END OF TASK**REPLACEMENT**

1. Place blower fan (Figure 2, Item 2) on a suitable work area and install fan shroud (Figure 2, Item 3) and bearing supports (Figure 2, Item 4) onto blower fan (Figure 2, Item 2), support by installing three nuts (Figure 2, Item 10) and bolts (Figure 2, Item 11) onto bearing supports (Figure 2, Item 4).
2. Install shaft collar (Figure 2, Item 15) and set screw (Figure 2, Item 13) onto shaft of blower fan (Figure 2, Item 2).
3. Mount pulley assembly (Figure 2, Item 8), key (Figure 2, Item 9) and set screw (Figure 2, Item 14) onto shaft of blower fan (Figure 2, Item 2).
4. Install assembled blower fan (Figure 2, Item 2) into enclosure (Figure 2, Item 1) and align bearing supports (Figure 2, Item 4).
5. Install three bearing supports (Figure 2, Item 4) onto bearing (Figure 2, Item 6) (on control panel side of ECU) and loosely install three mounting bolts (Figure 2, Item 12) and nuts (Figure 2, Item 10).
6. Properly position bearing supports (Figure 2, Item 4) and install three bolts (Figure 2, Item 5).
7. Verify that all hardware has been properly tightened.

NOTE

Prior to performing the following step, inspect evaporator motor belt.
Ensure that no visible damage is present.

8. Slide belt (Figure 2, Item 7) over blower pulley (Figure 2, Item 8) and evaporator motor pulley (Figure 1, Item 10).

NOTE

When performing the following steps, deflection of belt (Figure 2, Item 7) should not be greater than one inch.

If necessary, refer to procedure in this WP for steps 2 through 4.

9. Move motor to make proper tension adjustment to belt.
 - Down to increase the tension on belt.
 - Up to the decrease tension on belt.

REPLACEMENT – Continued**NOTE**

When performing the following step, tighten hardware on control panel side of ECU first.

10. Tighten hardware on fan motor mounting studs.
11. Verify tension of evaporator motor belt (Figure 1, Item 11) as described in this WP.
12. Replace rear evaporator chamber access panel.
13. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

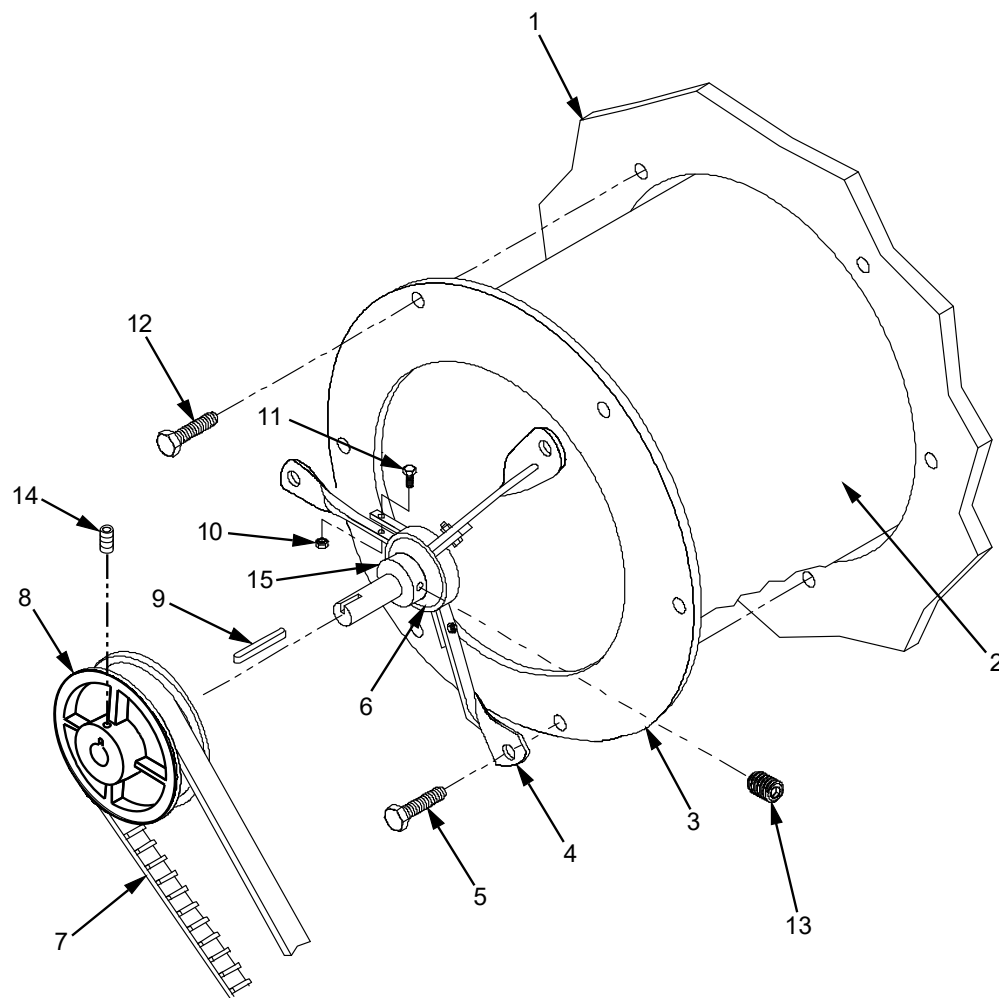


Figure 2. Evaporator Blower Fan Replace.

END OF TASK

ECU EVAPORATOR MOTOR BELT TENSION ADJUSTMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)
Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

None Required

References

WP 0005

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

ADJUSTMENT

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Unlatch and remove rear evaporator chamber access panel (Figure 1, Item 2). Set access panel aside.
3. Loosen but do not remove four mounting nuts (Figure 1, Item 3), lock washers (Figure 1, Item 4) and flat washers (Figure 1, Item 5) on evaporator fan motor mounting studs (Figure 1, Item 6).

NOTE

When performing the following steps, deflection of evaporator motor belt (Figure 1, Item 8) should not be greater than one inch.

4. Move evaporator fan motor (Figure 1, Item 7) to make proper tension adjustment to evaporator motor belt (Figure 1, Item 8).
 - Down to increase the tension on the evaporator motor belt (Figure 1, Item 8).
 - Up to the decrease tension on the evaporator motor belt (Figure 1, Item 8).
5. Tighten four mounting nuts (Figure 1, Item 3) on the evaporator fan motor mounting studs (Figure 1, Item 6).
6. Verify tension of evaporator motor belt (Figure 1, Item 8).

ADJUSTMENT – Continued

7. Replace rear evaporator chamber access panel (Figure 1, Item 2).
8. Reconnect ECU power supply cable (Figure 1, Item 1).
9. Verify that ECU power cable (Figure 1, Item 1) is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

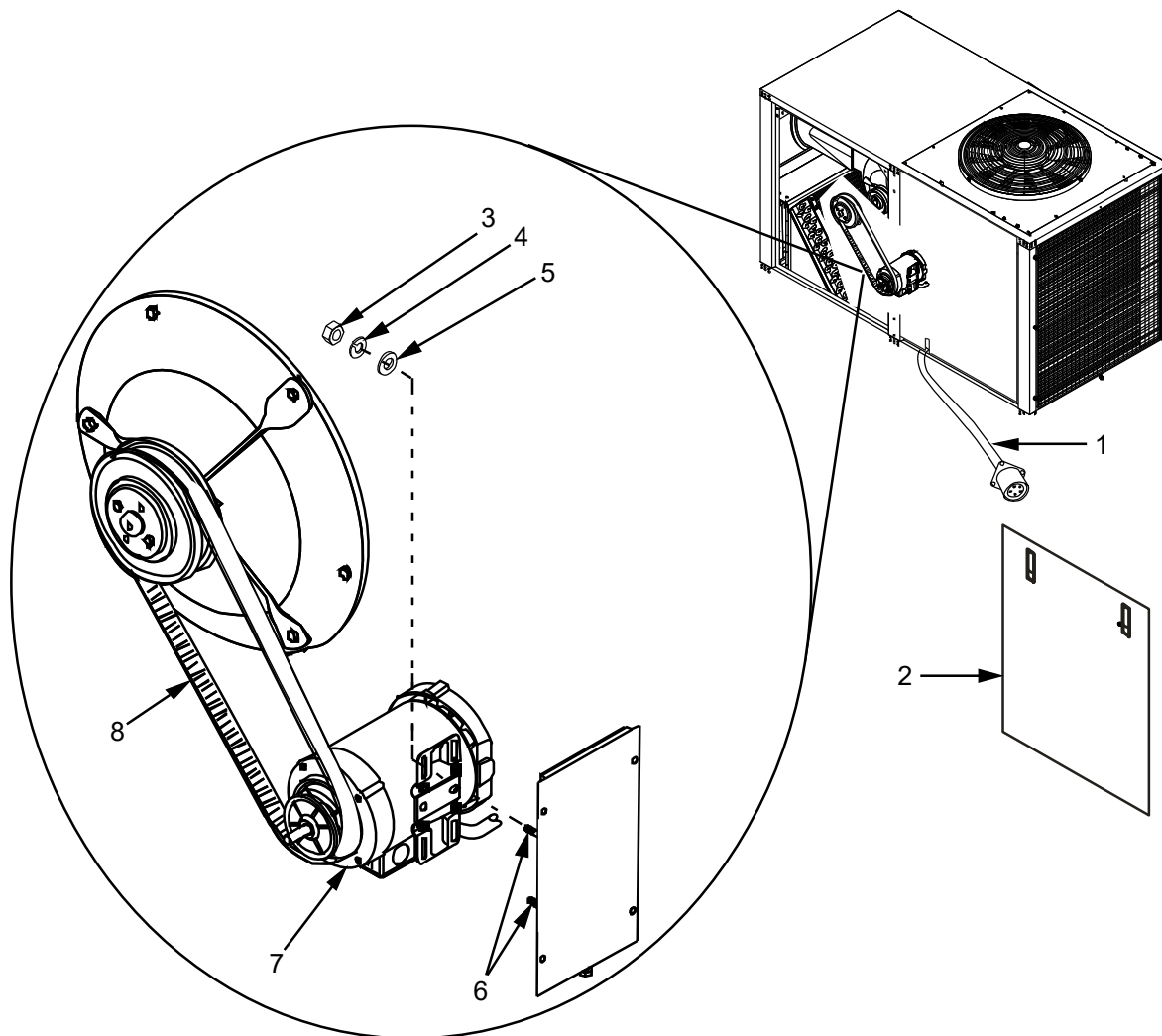


Figure 3. ECU Evaporator Motor Belt Adjustment.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU CONDENSER FAN MOTOR MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU condenser fan motor.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (120 VAC), DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present in the Control Panel. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

If a circuit breaker does not stay in ON position when energized, DO NOT attempt to energize repeatedly. That could create an overload situation hazardous to personnel and equipment. Instead, investigate and identify cause of problem. Correct situation before attempting to energize breaker again.

To avoid electrical shock and damage to equipment, ensure circuit breaker(s) are set to OFF and power cable is disconnected at power source before removing or replacing any cables.

NOTE

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams.

ECU CONDENSER FAN MOTOR REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)
Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Condenser Fan Motor

References

WP 0005

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

REMOVAL**NOTE**

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel (Figure 1, Item 10) from ECU and set aside.
3. Remove and retain four screws (Figure 1, Item 1) that secure fan guard (Figure 1, Item 2) to top of ECU. Remove fan guard (Figure 1, Item 2) and set aside.
4. Mark and disconnect electrical wiring from condenser fan motor (Figure 1, Item 6).

NOTE

The following steps require two personnel, one on the side of the ECU and one on top.

5. Remove and retain four nuts (Figure 1, Item 9), bolts (Figure 1, Item 3) and flat washers (Figure 1, Item 8) that secure condenser fan motor (Figure 1, Item 6) to frame (Figure 1, Item 7).
6. Remove and retain two screws (Figure 1, Item 5) and cover (Figure 1, Item 4) on condenser fan motor (Figure 1, Item 6).

WARNING

Improperly lifting or carrying heavy equipment can result in serious injury or death. Refer to weight limits as outlined in front matter of this TM.

7. Remove condenser fan motor (Figure 1, Item 6) from top of ECU and set aside.
8. Using puller, remove fan blade assembly (Figure 1, Item 11) and key (Figure 1, Item 12) from shaft of condenser fan motor (Figure 1, Item 6).

END OF TASK

REPLACEMENT**NOTE**

If necessary, refer to Fold Out Pages/wiring diagrams of ECU.

The following step requires two personnel, one on the side of the ECU and one on top.

1. If applicable, install fan blade assembly (Figure 1, Item 11) and key (Figure 1, Item 12) onto shaft of condenser fan motor (Figure 1, Item 6).
2. Place condenser fan motor (Figure 1, Item 6) on top of ECU.
3. If applicable, remove and retain in two screws (Figure 1, Item 5) and cover (Figure 1, Item 4) on condenser fan motor (Figure 1, Item 6).
4. Connect electrical wiring to condenser fan motor (Figure 1, Item 6) (see Table 1).

Table 1. Condenser Fan Motor Electrical Connections.

Wire Color	Motor Connection	Harness Connection (Wire #)
Green	Ground	11C
Black	T1/T7	18
Red	T2/T8	19
White	T3/T9	20
	T4/T5/T6	No Connection

5. Install cover (Figure 1, Item 4) and secure using two screws (Figure 1, Item 5).

NOTE

The following step requires two personnel, one on the side of the ECU and one on top.

6. Lower condenser fan motor (Figure 1, Item 6) into ECU and align with frame (Figure 1, Item 7). Secure to frame (Figure 1, Item 7) using four nuts (Figure 1, Item 9), bolts (Figure 1, Item 3), and flat washers (Figure 1, Item 8).
7. Install fan guard (Figure 1, Item 2) to top of ECU and secure using four screws (Figure 1, Item 1).
8. Replace access panel (Figure 1, Item 10).
9. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

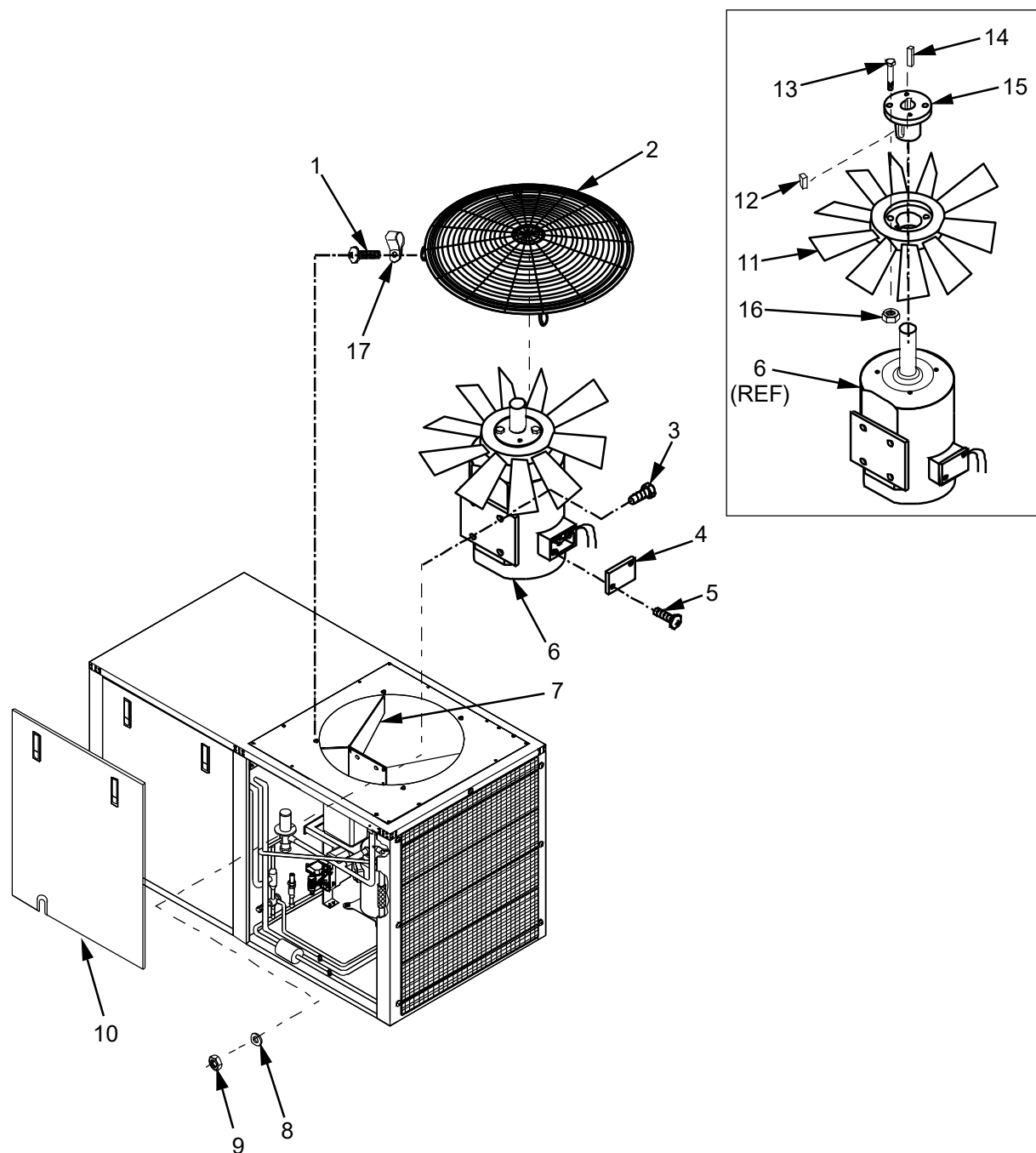


Figure 1. Condenser Fan Replace.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU FILTER/DRIER MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the filter/drier on the ECU.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

REFRIGERANT UNDER PRESSURE

Death or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part of the system that contains refrigerant. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

CAUTION

The filter/drier removes moisture and debris and stops contaminants from clogging expansion valve. The filter/dryer must be replaced anytime a non-electronic HVAC component is replaced.

NOTE

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams of the ECU.

ECU FILTER/DRIER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration service Tool Kit (WP 0132, Table 2, Item 3)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Filter/drier
Gloves, rubber (WP 0180, Table 1, Item 17)

References

WP 0005, WP 0115, WP 0116,

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel from ECU and set aside.

REMOVAL - continued

3. Remove insulation (Figure 1, Item 1) from filter/drier (Figure 1, Item 2) and surrounding pipes to safely allow brazing.
4. Recover refrigerant as described in WP 0116.
5. Debraze filter/drier (Figure 1, Item 2) at mounting joints (Figure 1, Item 3) as described in WP 0115 and remove filter/drier (Figure 1, Item 2).

END OF TASK**REPLACEMENT****WARNING**

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

1. Install filter/drier (Figure 1, Item 2) and braze mounting joints (Figure 1, Item 3) as described in WP 0115.
2. Leak test as described in WP 0116.
3. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0116.
4. Install insulation (Figure 1, Item 1) onto filter/drier (Figure 1, Item 2) and surrounding pipes.
5. Replace access panel.
6. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

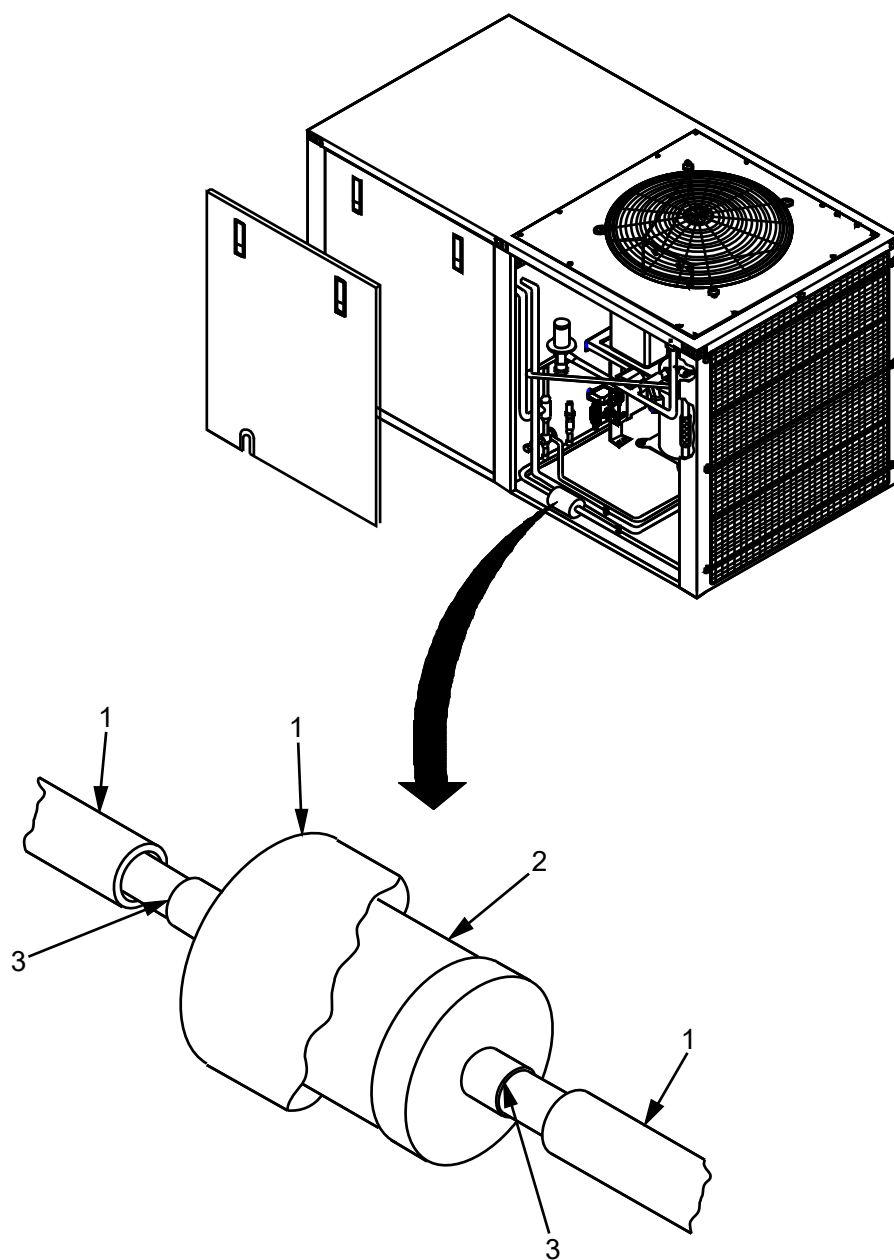


Figure 1. Filter/Drier Replace.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU COMPRESSOR AND VIBRATION DAMPER MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of components on the ECU. They consist of:

- Compressor removal/replacement
- Vibration damper removal/replacement

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

REFRIGERANT UNDER PRESSURE

Death or severe injury may result if you fail to observe safety precautions. Never use a heating torch on any part of the system that contains refrigerant. Do not let liquid refrigerant touch you, and do not inhale refrigerant gas.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

If necessary, refer to WP 0045 for troubleshooting and Fold Out Pages/wiring diagrams.

ECU COMPRESSOR REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

Materials/Parts

Compressor
Gloves, rubber (WP 0180, Table 1, Item 17)

References

WP 0005, WP 0046, WP 0110,
WP 0113, WP 0115, WP 0116,

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.

REMOVAL – Continued

2. Remove access panel from ECU and set aside.

CAUTION

Be cautious of thermostat wire and all other electrical cables associated with the ECU control panel. Avoid damage to thermostat wire, and all other electrical cables associated with the ECU control panel.

3. Remove bracket that secures Auxiliary heater pump and filter. If necessary, refer to WP 0110.
4. Remove insulation (Figure 1, Item 2) from compressor (Figure 1, Item 3), vibration damper (Figure 1, Item 11) and surrounding pipes to safely allow brazing.
5. Recover refrigerant as described in WP 0116.
6. Remove cover (Figure 1, Item 6) to allow access to electrical connections of compressor (Figure 1, Item 3).
7. Remove and retain nuts (Figure 1, Item 7) that secures electrical connections (T1, T2, T3 and ground) (Figure 1, Item 8) to compressor (Figure 1, Item 3). Remove electrical connections (T1, T2, T3 and ground) (Figure 1, Item 8) and loosely install hardware.

NOTE

When debrazing vibration dampener, de-solder on side furthest from compressor to avoid damage to vibration dampener.

8. Debraze vibration dampener (Figure 1, Item 11). If necessary, refer to WP 0115 for brazing procedures.
9. Remove and retain four bolts (Figure 1, Item 9) from base of compressor (Figure 1, Item 3).
10. Remove and retain four bolts (Figure 1, Item 4) and locking nuts (Figure 1, Item 5) from compressor mounting band (Figure 1, Item 10).

WARNING

Improperly lifting or carrying heavy equipment can result in serious injury or death. Refer to weight limits as outlined in front matter of this TM.

11. Remove compressor (Figure 1, Item 3) through opening on front side of ECU.
12. To prevent oil from spilling out of open lines, crimp and braze lines coming off of compressor (if necessary, refer to WP 0090).

END OF TASK

REPLACEMENT**WARNING**

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

HEAVY EQUIPMENT

Improperly lifting or carrying heavy equipment can result in serious injury or death. Refer to weight limits as outlined in front matter of this TM.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to WP 0046 for troubleshooting and Fold Out Pages/wiring diagrams for ECU.

1. Install compressor (Figure 1, Item 3) through the area vacated when ECU control panel was removed.
2. Install compressor mounting band (Figure 1, Item 10). Loosely install four bolts (Figure 1, Item 4) and lock nuts (Figure 1, Item 5) through compressor mounting band (Figure 1, Item 10).
3. Loosely install four bolts (Figure 1, Item 9) into base of compressor (Figure 1, Item 3) securing compressor (Figure 1, Item 3) to base of ECU.
4. Remove cover (Figure 1, Item 6) to allow access to electrical connections (Figure 1, Item 8) of compressor (Figure 1, Item 3).
5. Remove and retain nuts (Figure 1, Item 7) that secure electrical connections (Figure 1, Item 8) to compressor (Figure 1, Item 3). Install electrical connections (Figure 1, Item 8) (see Table 1) and install hardware.

Table 1. Compressor Connections.

FROM (Compressor)	TO (Compressor Contactor)	Wire #	Wire Color
T1	T1	24	Black
T2	T2	25	Red
T3	T3	26	White
Ground		11D	

6. Install vibration dampener (Figure 1, Item 11) onto associated plumbing of compressor (Figure 1, Item 3) and braze vibration dampener (Figure 1, Item 11) into place. If necessary, refer to WP 0115 for brazing procedures.
7. Replace filter/dryer as described in WP 0113.

REPLACEMENT - Continued

8. Leak test as described in WP 0090.
9. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0116 & WP 0060.
10. Install insulation (Figure 1, Item 2) onto compressor (Figure 1, Item 3) and surrounding pipes.
11. Install bracket that secures Auxiliary heater pump and filter. If necessary, refer to WP 0110.
12. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

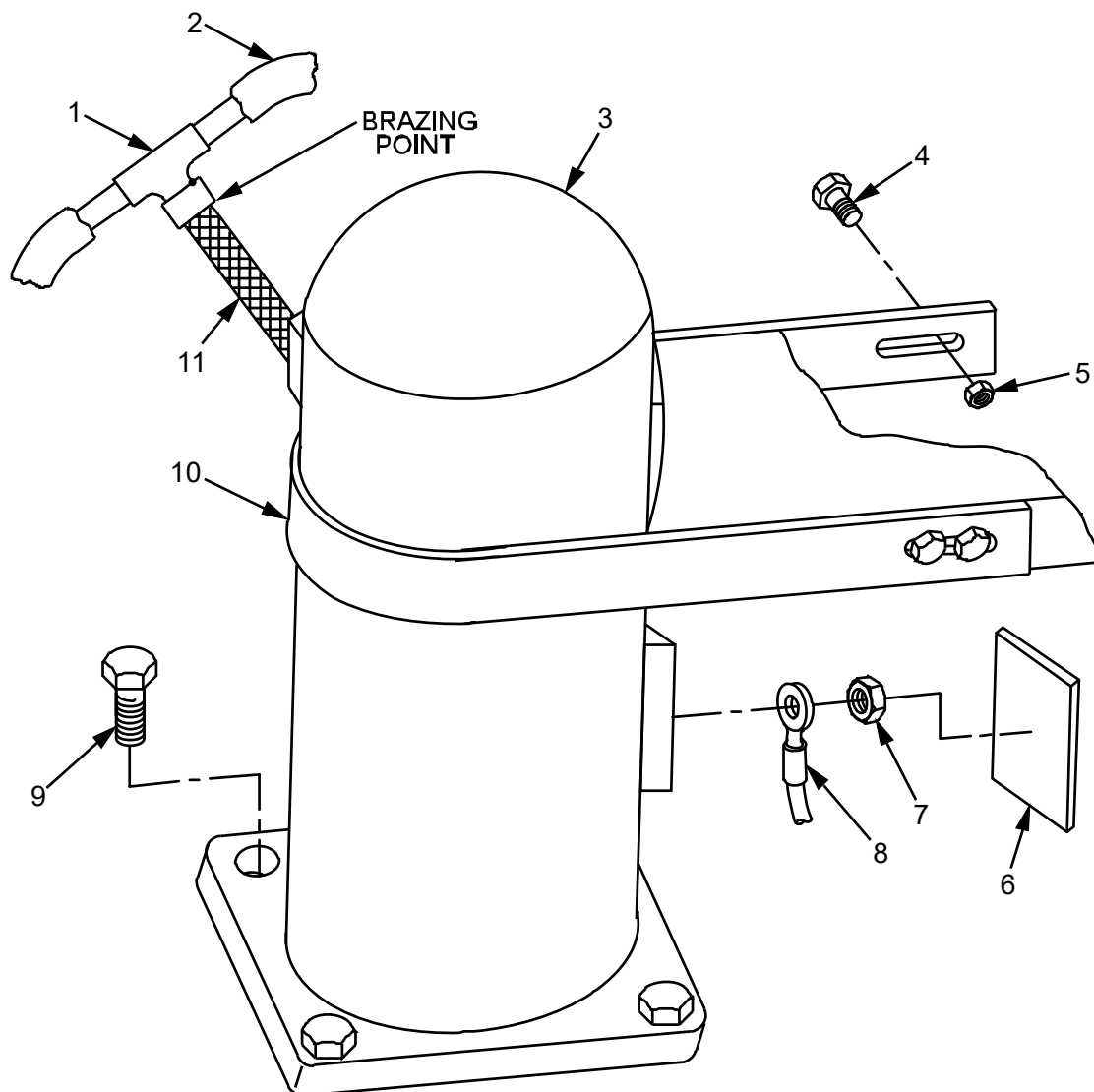


Figure 1. Compressor Replace.

END OF TASK

ECU VIBRATION DAMPER REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

Electronic Equipment Tool Kit (WP 0132, Table 2, Item 4)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 3)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0046, WP 0113,
WP 0115, WP 0116

Materials/Parts

Damper, Vibration
Gloves, rubber (WP 0180, Table 1, Item 17)

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

The following procedures require the use of open flame (brazing). Be observant of all components surrounding area being brazed. Do not damage, equipment or components. Only properly trained personnel should attempt to perform brazing procedures.

Death or severe damage may result if personnel fail to observe safety precautions. Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin/eye contact is possible. Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

If necessary, refer to WP 0046 for troubleshooting and Fold Out Pages/wiring diagrams for ECU.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access panel from ECU and set aside.
3. Remove insulation (Figure 1, Item 2) from vibration damper (Figure 1, Item 11) and surrounding pipes to safely allow brazing.
4. Recover refrigerant as described in WP 0116.
5. Debraze vibration damper (Figure 1, Item 11) and remove. If necessary, refer to WP 0115 for brazing procedures.

END OF TASK**REPLACEMENT**

1. Install vibration damper (Figure 1, Item 11) onto associated plumbing of compressor (Figure 1, Item 3) and braze vibration damper (Figure 1, Item 11) into place. If necessary, refer to WP 0115 for brazing procedures.
2. Replace filter/drier as described in WP 0113.
3. Leak test as described in WP 0116.
4. Charge system with 8.4 lbs (3.18 Kg) of R-407C refrigerant as described in WP 0116.
5. Install insulation (Figure 1, Item 2) onto compressor (Figure 1, Item 3) and surrounding pipes.
6. Replace access panel.
7. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU PURGING AND BRAZING MAINTAINER MAINTENANCE

GENERAL

This work package provides information on purging and brazing. The refrigeration system must be purged with dry nitrogen before brazing is performed on any component or tubing. A flow of dry nitrogen, at a rate less than 1-2 cfm (0.028-0.057 m³/minute), must be continued during all brazing operations to minimize internal oxidation and scaling of fluids and components or tubing. Brazing is required when removing/replacing plumbing components and associated piping inside of the ECU.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

Brazing alloys and flux contain materials that are hazardous to health. Avoid breathing vapors or fumes from brazing operations. Perform operations only in well ventilated areas. Wash hands with soap and water after handling brazing alloys and flux. Wear gloves and protective goggles or face shield to protect against burns.

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be removed and recovered from the system and the entire system must be purged with dry nitrogen before beginning any brazing operation.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

The following procedures require the use of open flame (brazing). Be observant of all fluids and components surrounding area being brazed. Do not damage, equipment or fluids and components. Only properly trained personnel should attempt to perform brazing procedures.

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocate and, therefore, must be discharged in a ventilated location.

If heat is applied slowly, or only on one side of a connection, the entire component or length of connecting tubing will become heated and filler alloy in adjacent joints may melt.

NOTE

It may be easier to access a component by cutting or debrazing the copper lines in accessible areas and removing part of the interconnecting tubing with the component.

If necessary, refer to WP 0034 for troubleshooting and Fold Out Pages/wiring diagrams of the ECU.

All tubing in the refrigeration system is seamless copper with a bright internal finish that permits thorough cleaning and prevents entrapment of moisture or other impurities. Rigid grade copper is used for straight sections and soft grade for sections that must be bent. All interconnecting fittings, such as elbows, tees, etc., are also copper. The bodies of valves and connections on other fluids and components are brass. Joints, except for those with flare fittings, are brazed in accordance with the American Welding Society (AWS) C3.4, Specification for Torch Brazing, except that radiographic examination is not required.

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

ECU SYSTEM PURGING

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 6)
Nitrogen Pressure Regulator (WP 0132, Table 2, Item 7)
/face shield

Materials/Parts

Nitrogen
Gloves, rubber (WP 0180, Table 1, Item 17)

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

NOTE

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

The refrigeration system must be purged with dry nitrogen before brazing is performed on any component or tubing. A flow of dry nitrogen, at a rate less than 1-2 cfm (0.028-0.057 m³/minute), must be continued during all brazing operations to minimize internal oxidation and scaling of fluids and components or tubing.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access cover(s).
3. Attach red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
4. Disconnect refrigerant hose (yellow) from gauge manifold and allow to hang open to ambient air.
5. Open valves to both gauges.
6. Observe gauges. Once both gauges read 0 psig, close valves, disconnect red gauge/line from LIQUID HIGH PRESSURE and blue gauge/line from SUCTION LOW PRESSURE.
7. Re-connect all refrigerant hoses to gauge manifold.
8. Replace covers on LIQUID HIGH PRESSURE and SUCTION LOW PRESSURE ports on ECU.
9. Proceed to brazing procedures as described in this WP.

END OF TASK

ECU DEBRAZING

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 6)
Nitrogen Pressure Regulator (WP 0132, Table 2, Item 7)
/face shield

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005

Materials/Parts

Brazing, alloy (WP 0180, Table 1, Item 6)
Flux, brazing (WP 0180, Table 1, Item 22)
Cloth, cleaning (WP 0180, Table 1, Item 12)
Cloth, Abrasive (WP 0180, Table 1, Item 11)
Gloves, rubber (WP 0180, Table 1, Item 17)

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

DEBRAZING**NOTE**

It may be easier to access a component by cutting or debrazing the copper lines in accessible areas and removing part of the interconnecting tubing.

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

1. Protect wiring harnesses and other electronic fluids and components with appropriate heat shields, heat sinks.
2. If debrazing a joint on a valve, disassemble the valve to the fullest extent possible and wrap all but the joint with a wet rag to act as a heat sink.

WARNING

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be removed and recovered from the system and the entire system must be purged with dry nitrogen before beginning any brazing operation.

CAUTION

If heat is applied slowly, or only on one side of a connection, the entire component or length of connecting tubing will become heated and filler alloy in adjacent joints may melt.

DEBRAZING - Continued

3. Check that the system is being purged and apply sufficient heat uniformly around the joint to quickly melt the filler alloy. Remove heat as soon as the joint is separated.
 - a. All filler alloy must be cleaned from debrazed joints before reassembly.
 - b. Heat each piece of the joint until the filler alloy is melted and then wipe it away with a damp cloth. Be sure no filler alloy or other debris is left inside any tubing, fitting or component. Use abrasive cloth as necessary to clean joints.

END OF TASK

ECU BRAZING

INITIAL SETUP:**Tools and Special Tools**

General Mechanic's Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 6)
Nitrogen Pressure Regulator (WP 0132, Table 2, Item 7)
/face shield

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005

Materials/Parts

Brazing, alloy (WP 0180, Table 1, Item 6)
Flux, brazing (WP 0180, Table 1, Item 22)
Cloth, cleaning (WP 0180, Table 1, Item 12)
Cloth, Abrasive (WP 0180, Table 1, Item 11)
Gloves, rubber (WP 0180, Table 1, Item 17)

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

BRAZING**NOTE**

Joints, except for those with flare fittings, are brazed using Grade IV or VI brazing alloy (15% silver) and Type-B flux must be used for all copper to brass joints. Grade III (45% silver) brazing alloy may be substituted for Grade IV or VI for copper-to-copper joints; flux is not required for copper-to-copper joints.

A technician certified to perform such duties in accordance with EPA restrictions must perform refrigeration system repairs. Performing repairs without proper certification may be a violation of public law and subject to severe penalties.

1. Protect wiring harnesses and other fluids and components with appropriate heat shields and heat sinks.
2. If brazing a joint on a valve, disassemble the valve to the fullest extent possible and wrap all but the joint with a wet rag to act as a heat sink.

NOTE

If interconnecting tubing was removed with a component, braze tubing to the new fluids and components before installation.

3. Clean all internal and external areas to be brazed with abrasive cloth.
4. Apply flux to all internal and external areas to be brazed.
5. Position component(s) or assembly into place.

BRAZING - Continued**WARNING**

Never use a heating torch on any part that contains refrigerant. Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. All refrigerant must be removed and recovered from the system and the entire system must be purged with dry nitrogen before beginning brazing operations.

CAUTION

If heat is applied slowly, or to one side of a connection, the entire component or length of tubing will become heated and filler alloy in adjacent joints may melt. Brazing a joint without nitrogen flow through the tubing will cause deposits to form on the inside of the tube and may cause obstructions in the refrigeration system or equipment damage.

6. Check that the system is being purged (see procedure in this WP) and apply sufficient heat uniformly around the joint to quickly melt the filler alloy. Remove heat as soon as brazing is completed. Continue purging for at least five (5) minutes or until the connection has cooled.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU SYSTEM CHARGING, RECOVERY AND LEAK TEST MAINTAINER MAINTENANCE

GENERAL

This work package provides information on system evacuation (vacuuming). The ECU must be evacuated to remove all moisture and air before it is charged. These procedures describe how to accomplish such tasks.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or in any situation where skin or eye contact with refrigerant is possible.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

Never introduce liquid refrigerant into the suction shut off valve. This can cause damage to the compressor.

CAUTION

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocate and, therefore, must be discharged in a ventilated location.

NOTE

The electronic refrigerant gas leak detector is highly sensitive to the presence of minute quantities of gas in the air, due to this fact it is quite effective in the detection of small leaks. However, because of the rapid dispersion of refrigerant gas into the surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well-ventilated but draft-free area.

ECU REFRIGERANT SYSTEM RECOVERY

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 6)
Refrigerant Recovery/recycling Unit (WP 0132, Table 2, Item 8)
Charging manifold (WP 0132, Table 2, Item 10)
Charging cylinder (WP 0132, Table 2, Item 11)
/face shield

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)
Refrigerant

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected from
Power Source

PROCEDURE**NOTE**

Prior to beginning the following procedure, make sure all valves are closed. After completing the procedure, perform a Confidence Check.

The refrigerant recovery/recycling unit should be fitted with a filter/dryer for improved performance and preservation of the refrigerant.

When recovering refrigerant, never exceed 80% capacity of the recovery cylinder. This will allow for expansion of refrigerant due to heat during storage and/or transportation.

1. Connect red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
2. Connect refrigerant hose (yellow) to refrigerant recovery unit inlet (see Figure 1).
3. Connect refrigerant recovery unit to vapor valve (blue) on recovery cylinder (see Figure 1).
4. Open vapor valve (blue) on recovery cylinder.
5. Power on recovery unit.
6. Open outlet ball valve on the refrigerant recovery unit.
7. Open liquid valve (red) on service gauge.
8. On recovery unit, press compressor start switch.
9. Open inlet ball valve on recovery unit until gauges show 0 psig.
10. Once gauges read 0 psig, close all valves on recovery cylinder, service gauge, recovery unit.
11. Remove all hoses and return all equipment to its appropriate storage.

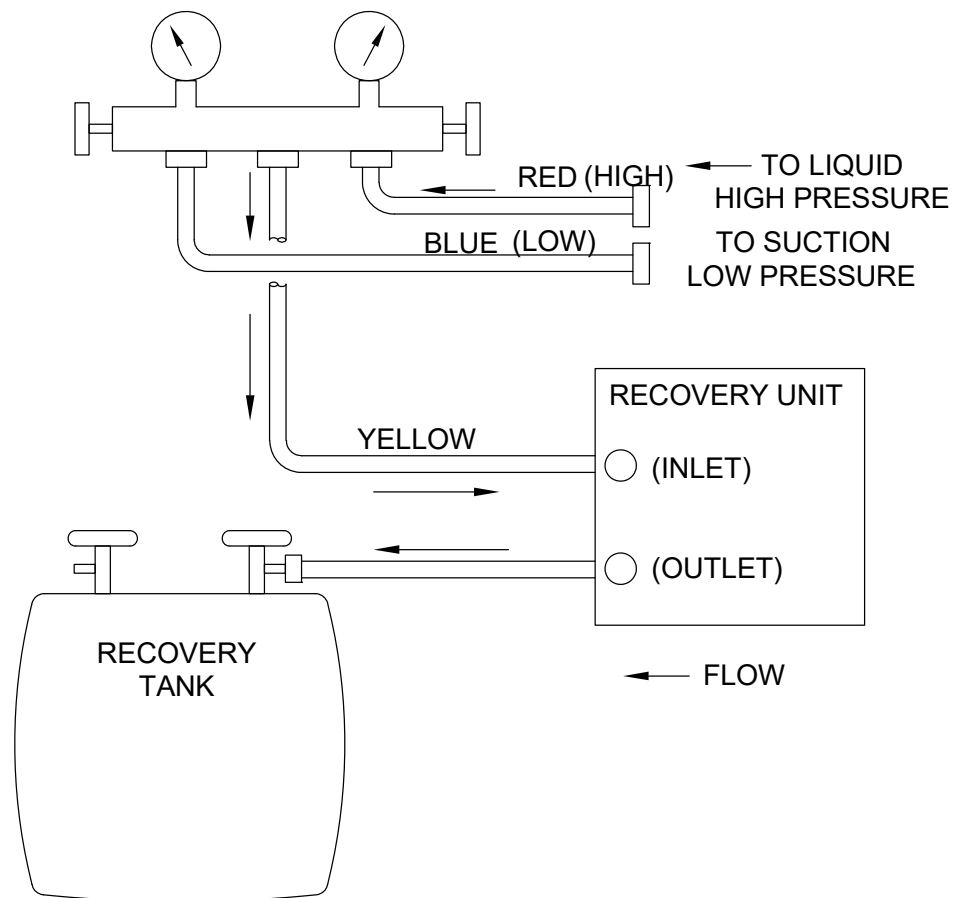


Figure 1. Refrigerant Recovery Layout.

END OF TASK

ECU REFRIGERANT SYSTEM CHARGING

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 6)
Refrigerant Recovery/recycling Unit (WP 0132, Table 2, Item 8)
Charging manifold (WP 0132, Table 2, Item 10)
Charging cylinder (WP 0132, Table 2, Item 11)
/face shield

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)
Refrigerant

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

PROCEDURE**WARNING**

Never introduce liquid refrigerant into the suction shut off valve. This can cause damage to the compressor.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

The system must be evacuated before charging. Moisture and air in the system will prevent the refrigeration unit from operating properly.

NOTE

The refrigerant should be fitted with a filter/dryer for improved performance and preservation of the refrigerant.

Prior to beginning the following procedure, make sure all valves are closed.

After completing the procedure, perform a Confidence Check.

Using Electronic Refrigerant Scale.

1. Connect refrigerant hose (red) from service gauges to input high pressure line (inside ECU, near filter/Drier).
2. Connect refrigerant hose (blue) from service gauges to low pressure line (inside ECU, behind filter/Drier).
3. Connect refrigerant hose (yellow) from service gauges to output on electronic refrigerant scale (see Figure 2).

Using Electronic Refrigerant Scale – Continued

4. Connect refrigerant hose from bottle of R-407C to input side of electronic refrigerant scale (see Figure 2).
5. Open valve on bottle of R-407C (valve at top).
6. Place electronic refrigerant scale on flat level surface and prepare scale for use.
7. Invert bottle of R-407C (valve at bottom) and place on electronic refrigerant scale.
8. Set electronic refrigerant scale for 8.4 pounds of refrigerant and start electronic refrigerant scale.
9. SLOWLY open hi pressure valve (red) on service gauges.
10. When electronic refrigerant scale closes and alarm sounds, close hi pressure valve (red) on service gauges.
11. Close valve on bottle of R-407C and remove bottle of R-407C from electronic refrigerant scale.
12. Disconnect refrigerant hose (yellow) from electronic refrigerant scale.
13. Disconnect refrigerant hose (red) from input high pressure line (inside ECU, near filter/Drier) and replace cap.
14. Disconnect refrigerant hose (blue) from low pressure line (inside ECU, behind filter/Drier) and replace cap.

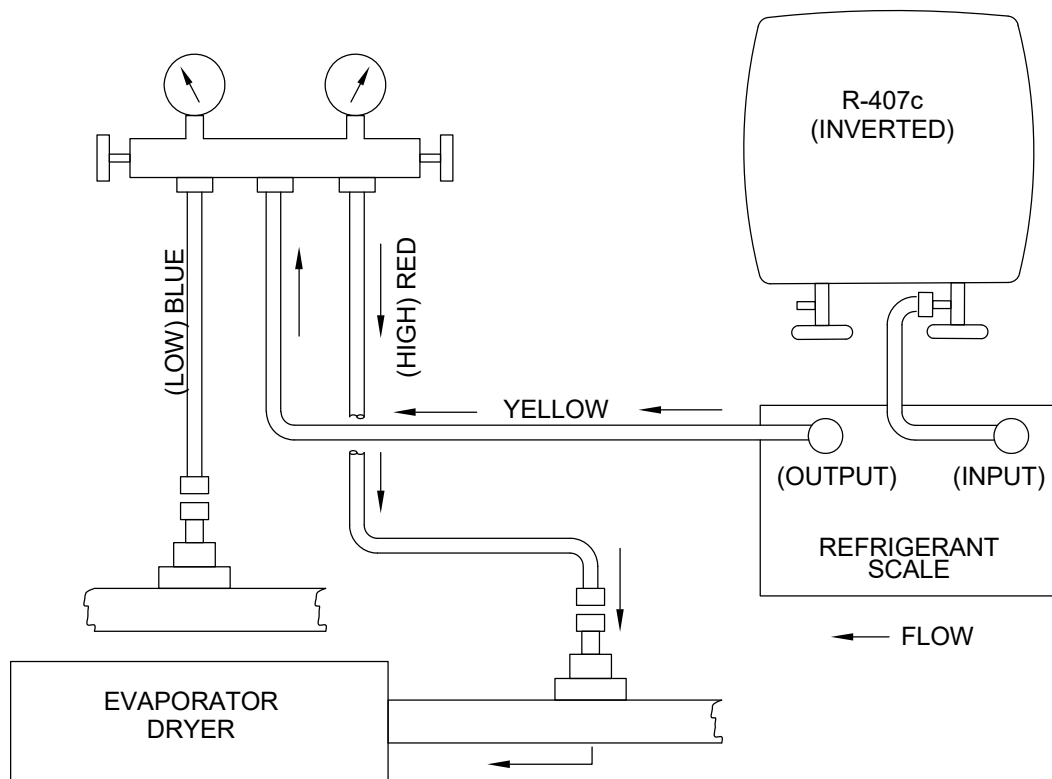


Figure 2. System Charging (Using Electronic Refrigerant Scale).

END OF TASK

Using Standard Scale

1. Connect refrigerant hose (red) from service gauges to input high pressure line (inside ECU, near filter/Drier) (see Figure 3).
2. Connect refrigerant hose (blue) from service gauges to low pressure line (inside ECU, behind filter/Drier).
3. Place bottle of R-407C on scale noting starting weight of bottle of R-407C and calculate desired end weight for desired charge.
4. Connect refrigerant hose (yellow) from service gauges to output bottle of R-407C (see Figure 3).
5. Open valve on bottle of R-407C (valve at top).
6. Place scale on flat level surface.
7. Invert bottle of R-407C (valve at bottom) and place on scale.
8. SLOWLY open hi pressure valve (red) on service gauges and monitor weight of bottle on scale.
9. When scale reads desired calculated weight, close hi pressure valve (red) on service gauges.
10. Close valve on bottle of R-407C and remove bottle from scale.
11. Disconnect refrigerant hose (yellow) from bottle of R-407C.
12. Disconnect refrigerant hose (red) from input high pressure line (inside ECU, near filter/Drier) and replace cap.
13. Disconnect refrigerant hose (blue) from low pressure line (inside ECU, behind filter/Drier) and replace cap.

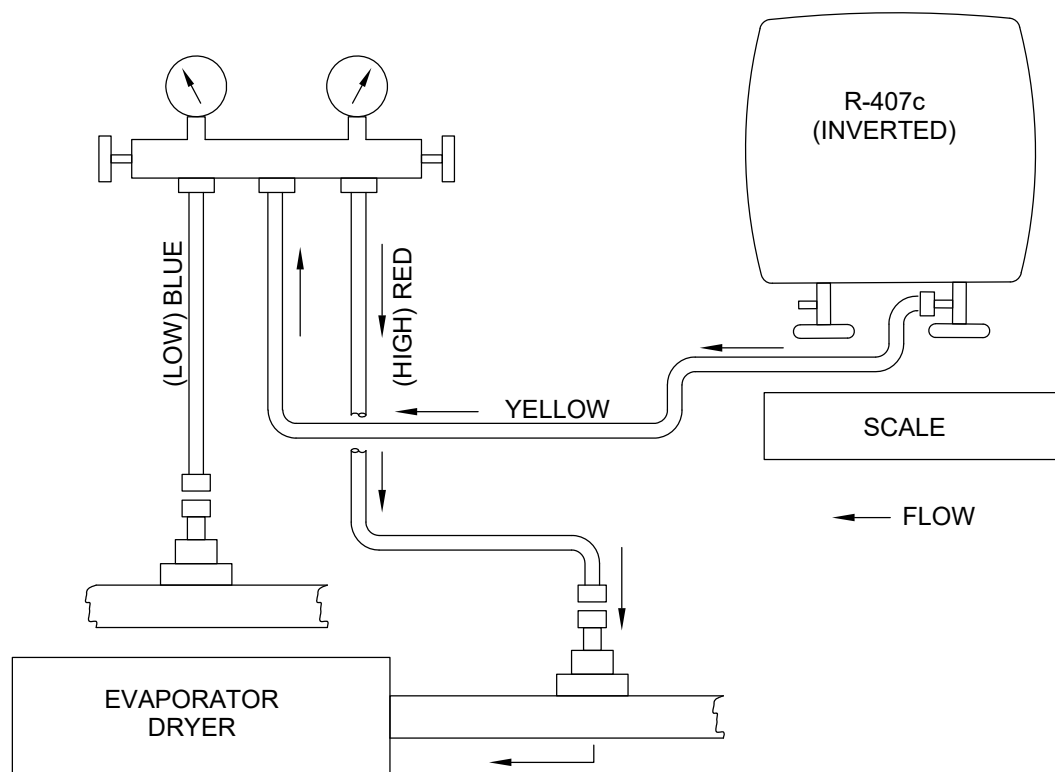


Figure 3. System Charging (Using Standard Scale).

END OF TASK

Confidence Check

1. Connect refrigerant hose (red) from service gauges to input high pressure line (inside ECU, near filter/Drier).
2. Connect refrigerant hose (blue) from service gauges to low pressure line (inside ECU, behind filter/Drier).
3. Turn on ECU (WP 0005) and allow system to stabilize for half an hour.
4. Verify that the HPC or LPC switch does not shut down, the compressor.

NOTE

The HPC switch cut out is 500 PSIG +/- 3% and cut in (with manual reset button) is 375 PSIG +/- 8%.

The LPC switch cut out is 25 PSIG +/- 3 % and cut in is 50 PSIG +/- 3%.

5. Verify that the ECU provides conditioned air.
6. Turn off ECU (WP 0005) and allow system components to cool before completing step 7.
7. Disconnect refrigerant hose (red) from input high pressure line (inside ECU, near filter/Drier) and replace cap.
8. Disconnect refrigerant hose (blue) from low pressure line (inside ECU, behind filter/Drier) and replace cap.
9. Return ECU to service.

END OF TASK

ECU LEAK TESTING

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 6)
Nitrogen Pressure Regulator (WP 0132, Table 2, Item 7)
Refrigerant Recovery/Recycling Unit (WP 0132, Table 2, Item 8)
/face shield

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005, WP 0115

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)
Nitrogen
Refrigerant, R-407C

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

ADDING NITROGEN HOLDING CHARGE**NOTE**

Prior to beginning the following procedure, make sure all valves are closed.

1. Attach red gauge/line to LIQUID HIGH PRESSURE and blue gauge/line to SUCTION LOW PRESSURE.
2. Attach refrigerant hose (yellow) to refrigerant bottle.
3. With refrigerant recovery/recycling unit inverted (valve at the bottom) open the valve on the unit.
4. Open the high side valve (red) on the gauge manifold and add 15 psig of refrigerant to the system.
5. Once 15 psig of refrigerant has been added, close the valves on the refrigerant recovery/recycling unit and the high side valve (red) on the gauge manifold.
6. Disconnect the refrigerant hose (yellow).
7. Set the nitrogen regulator to 400 psig.
8. Connect the refrigerant hose (yellow) to the pressure regulator on the nitrogen tank.
9. Slowly open valves on nitrogen tank and high side valve (red) on the gauge manifold and slowly add nitrogen.
10. When gauge manifold reads 350 psig close high side valve (red) on gauge manifold then close valve on the nitrogen regulator and check for leaks as described in this WP.

END OF TASK

LEAK TESTING**Using Electronic Refrigerant Leak Detector**

1. Allow system to "stand idle" for 30 minutes.
2. Check pressure gauges for excessive drops in pressure.

NOTE

The electronic refrigerant gas leak detector is highly sensitive to the presence of minute quantities of gas in the air, due to this fact it is quite effective in the detection of small leaks. However, because of the rapid dispersion of refrigerant gas into the surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well-ventilated but draft-free area.

3. If no excessive leaks are observed, check ECU components and joints with electronic refrigerant leak detector.
4. If no excessive leaks are found with electronic refrigerant leak detector, purge system as described in WP 0115.
5. If leaks are found, continue purging system and repair leaks and or replace parts as required. Once repairs are completed, re-test for leaks.

END OF TASK**Using Soap Solution**

1. Allow system to "stand idle" for 30 minutes.
2. Check pressure gauges for excessive drops in pressure.

If no excessive leaks are observed:

3. Mix a solution of liquid detergent and water.
4. Brush solution onto all possible leakage points.
5. Observe for the formation of bubbles.
6. If no excessive leaks are found, purge system as described in WP 0115.
7. If leaks are found, repair leaks and or replace parts as required. Once repairs are completed, re-test for leaks.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU SUBCOOL SETTING MAINTAINER MAINTENANCE

GENERAL

This work package provides information on checking, setting and adjusting subcool. Subcool is the difference in degrees between the saturation temperature of the refrigerant at its current pressure and the actual temperature of the liquid. In other words, the refrigerant pressure remains constant while the temperature is lowered. The number of degrees F below the condensation point is the amount of subcool.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures. AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or in any situation where skin or eye contact with refrigerant is possible.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

Never introduce liquid refrigerant into the suction shut off valve. This can cause damage to the compressor.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around the HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock.

CAUTION

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocate and, therefore, must be discharged in a ventilated location.

ECU SUBCOOL CHECKING/ADJUSTING

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 6)
Refrigerant Recovery/recycling Unit (WP 0132, Table 2, Item 8)
Charging manifold (WP 0132, Table 2, Item 10)
Charging cylinder (WP 0132, Table 2, Item 11)
face shield

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)
Refrigerant

Personnel Required

Utilities Equipment Repairer,
MOS 91C (1)

References

WP 0005, WP 0116

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

SET-UP**NOTE**

Prior to beginning the following procedure, make sure ALL valves are closed.

The refrigerant recovery/recycling unit should be fitted with a filter/dryer for improved performance and preservation of the refrigerant.

When recovering refrigerant, never exceed 80% capacity of the recovery cylinder. This will allow for expansion of refrigerant due to heat during storage and/or transportation.

Return air ambient temperature must be above 70°F to perform the following procedure.

1. Place thermocouple wire near discharge side of condenser and tape as close to inlet side of filter/dryer as possible.
2. Install all access panels to ensure no ambient temperatures may be introduced.
3. Verify that ductwork is connected. If ductwork is not available, cover ends to restrict return air flow.
4. Connect red line to LIQUID HIGH PRESSURE.
5. Connect blue line to SUCTION LOW PRESSURE.
6. Verify that ECU power cable is connected to Power Source and start ECU in accordance with ECU Start Procedure (WP 0005).
7. Set MODE SELECT switch to COOL and adjust TEMPERATURE to 70°F.

END OF TASK

CHECKING**NOTE**

R-407C has a glide, pressure on gauge will modulate, use mean pressure for determining reading.

1. After allowing ECU to stabilize (approx. 30 minutes), read temperature on thermocouple and pressure on high pressure gauge and record.
2. Using refrigerant chart for R-407C, convert reading from high pressure gauge to temperature.
3. Subtract thermocouple temperature from refrigerant chart for R-407C temperature (bubble point). The result is the subcool value. (i.e., using R-407C). The liquid refrigerant temperature is 110°F. The refrigerant pressure gauge reads 298 psig. From the Bubble Pressure in Table 1, 298 psig converts to 120°F. Therefore, the subcooling is: 120°F minus 110°F equals 10°F).

END OF TASK**ADJUSTING****NOTE**

If subcool is not between 14 and 19 perform the following.

Refer to WP 0116 for charging and recovery procedures.

1. If subcool is below 14:
 - a. Add four ounces of refrigerant to the low pressure service port.
 - b. After allowing ECU to stabilize (approx. 10 minutes), read temperature on thermocouple and pressure on high pressure gauge and record.
 - c. Subtract thermocouple temperature from refrigerant chart for R-407C temperature (bubble point). The result is the subcool value. (i.e., using R-407C). The liquid refrigerant temperature is 110°F. The refrigerant pressure gauge reads 298 psig. From the Bubble Pressure in Table 1, 298 psig converts to 120°F. Therefore, the subcooling is: 120°F minus 110°F equals 10°F).
 - d. If necessary, repeat procedure until subcool is met.
2. If subcool is above 19:
 - a. Remove four ounces of refrigerant to the low pressure service port.
 - b. After allowing ECU to stabilize (approx. 10 minutes), read temperature on thermocouple and pressure on high pressure gauge and record.
 - c. Subtract thermocouple temperature from refrigerant chart for R-407C temperature (bubble point). The result is the subcool value. (i.e., using R-407C). The liquid refrigerant temperature is 110°F. The refrigerant pressure gauge reads 298 psig. From the Bubble Pressure in Table 1, 298 psig converts to 120°F. Therefore, the subcooling is: 120°F minus 110°F equals 10°F).
 - d. If necessary, repeat procedure until subcool is met.

END OF TASK

Table 1. R-407C Conversion Table.

R-407C			
TEMPERATURE		BUBBLE PRESSURE (psig)	DEW PRERSSURE (psig)
°F	°C		
-60	-51.1	9.1 ("Hg Vac)	15.9 ("Hg Vac)
-55	-48.3	5.9 ("Hg Vac)	13.5 ("Hg Vac)
-50	-45.5	2.4 ("Hg Vac)	10.9 ("Hg Vac)
-45	-42.7	0.7	7.9 ("Hg Vac)
-40	-40	2.9	4.5 ("Hg Vac)
-35	-37.2	5.2	0.7 ("Hg Vac)
-30	-34.4	7.9	1.7
-25	-31.6	10.7	4.0
-20	-28.8	13.9	6.5
-15	-26.1	17.3	9.3
-10	-23.3	21.1	12.4
-5	-20.5	25.2	15.8
0	-17.7	29.6	19.5
5	-15	34.4	23.6
10	-12.2	39.6	28.0
15	-9.4	45.2	32.7
20	-6.6	51.3	37.9
25	-3.8	57.8	43.6
30	-1.1	64.7	49.6
35	1.6	72.2	55.2
40	4.4	80.2	63.2
45	7.2	88.7	70.7
50	10	97.6	78.8
55	12.7	107.5	87.5
60	15.5	117.7	96.8
65	18.3	128.7	105.7
70	21.1	140.2	117.2
75	23.8	152.5	128.4
80	26.6	165.5	140.4
85	29.4	179.2	153.1
90	32.2	193.6	166.5
95	35	208.8	180.8
100	37.7	224.9	195.8
105	40.5	241.8	211.8
110	43.3	259.6	228.7
115	46.1	278.2	246.5
120	48.8	297.8	265.3
125	51.6	318.3	285.2
130	54.4	339.9	306.1
135	57.2	362.4	328.2
140	60	386.0	351.4
145	62.7	410.7	375.9
150	65.5	436.5	401.7

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU SYSTEM EVACUATION MAINTAINER MAINTENANCE

GENERAL

This work package provides information on system evacuation (vacuuming). The ECU must be evacuated to remove all moisture and air before it is charged. These procedures describe how to accomplish such tasks.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from the ECU. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Sudden and irreversible tissue damage can result from freezing. Wear gloves and a face protector or in any situation where skin or eye contact with refrigerant is possible.

Heat may cause the refrigerant to decompose and release irritating, toxic, and corrosive gases. Prevent contact of refrigerant with flame or hot surfaces.

Never introduce high discharge pressure into a refrigerant cylinder. This can cause the cylinder to rupture and injure personnel.

CAUTION

Cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations. Nitrogen is an inert gas. However, it also presents danger as a suffocate and, therefore, must be discharged in a ventilated location.

NOTE

The electronic refrigerant gas leak detector is highly sensitive to the presence of minute quantities of gas in the air, due to this fact it is quite effective in the detection of small leaks. However, because of the rapid dispersion of refrigerant gas into the surrounding air, difficulty may be encountered in pinpointing large leaks. The detector must be used in a well-ventilated but draft-free area.

ECU SYSTEM EVACUATION

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Refrigeration Service Tool Kit (WP 0132, Table 2, Item 6)
Refrigerant recovery/recycling unit (WP 0132, Table 2, Item 8)
Pump, vacuum (WP 0132, Table 2, Item 9)

Personnel Required

Utilities Equipment Repairer, MOS 91C (1)

References

WP 0005, WP 0113, WP 0116

Materials/Parts

Hoses 1/2" ID

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected from Power Source

PREPARATION**NOTE**

The following procedure may be accomplished from the LIQUID HIGH PRESSURE and SUCTION LOW PRESSURE connections located on the outside of the ECU. However, manufacturer recommends that this process be accomplished from the internal ports.

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005), Power Source is shut down, and that power cable has been disconnected.
2. Remove access cover(s).
3. Ensure that system refrigerant has been removed and recovered as described in WP 0116.
4. Ensure that system has been leak tested as described in WP 0116.
5. Ensure that new filter/drier has been properly installed as described in WP 0113.

SHOP METHOD

1. Connect valve core removal isolation valves to the high pressure port (located next to the filter/drier) inside the ECU (see Figure 1).
2. Connect valve core removal isolation valves to the low pressure port (located behind the filter/drier) inside the ECU (see Figure 1).
3. Connect vacuum hoses to the pump inlet (see Figure 1).
4. Connect micron gauge to vacuum pump.
5. Remove valve cores and close isolation valve.

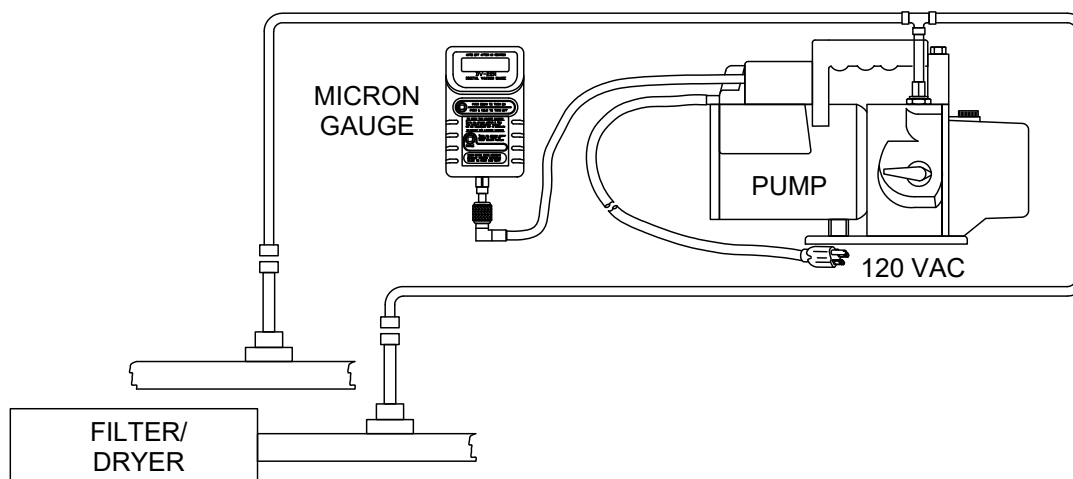


Figure 1. Evacuation Set-up (Shop Method).

FIELD METHOD

1. Connect high pressure hose (red) from gauges to high pressure port (located next to the filter/drier) inside the ECU (see Figure 2).
2. Connect low pressure hose (blue) from gauges to low pressure port (located behind to the filter/drier) inside the ECU (see Figure 2).
3. Connect micron gauge to vacuum pump.
4. Connect vacuum line (yellow) from gauges to micron gauge.

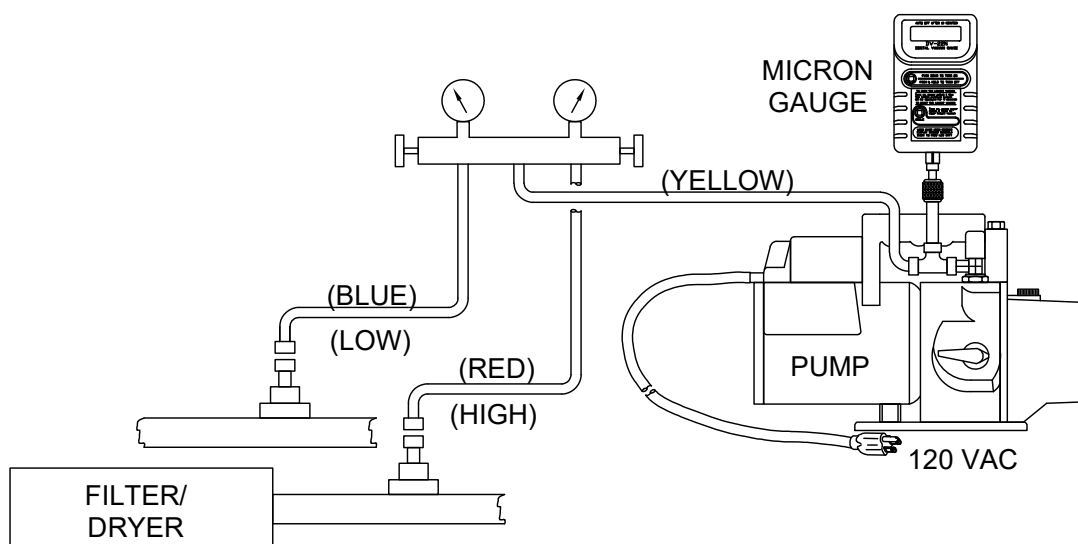


Figure 2. Evacuation Set-up (Field Method).

PROCEDURE

1. Check level and quality of oil in the vacuum pump.
2. Start pump and open valve on the pump inlet.
3. Set micron gauge to ON. After micron gauge reads 500 or less for several minutes, open isolation valves and reinstall service valve cores.

NOTE

While waiting for vacuum to complete, set up equipment for charging of system with R-407C (see WP 0116).

4. Once vacuum process is complete, de-energize pump and micron gauge.
5. Remove low pressure hose (blue), high pressure hose (red) and vacuum line (yellow) and replace service caps on the high pressure port (located next to the evaporator/dryer) and low pressure port (located behind the evaporator/dryer) inside the ECU.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
ECU REMOVAL MAINTAINER MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the ECU.

If necessary, refer to WP 0004 for the controls, indicators, and connectors of the ECU.

WARNING

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

Prior to performing any maintenance that requires climbing on or under trailer, ensure cage bolts are not inserted and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

Remove rings, bracelets, wristwatches, neck chains, and any other jewelry before working around HP-2C/185 UST Trailer. Jewelry can catch on equipment and cause injury or may short across an electrical circuit and cause severe burns or electrical shock

Fuel is very flammable and can explode easily. To avoid serious injury or death, keep fuel away from open fire and keep fire extinguisher within easy reach when working with fuel. Do not work on fuel system when engine is hot. Fuel can be ignited by hot engine. When working with fuel, post signs that read NO SMOKING WITHIN 50 FEET of HP-2C/185 UST Trailer.

NOTE

Removal of the access panels during operations will prevent the ECU from properly conditioning the air.

ECU REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Lifting device (WP 0132, Table 2, Item 5)
Sling
Drip pan

Personnel Required

Utilities Equipment Repairer, MOS
91C (1)

References

WP 0005

Materials/Parts

Gloves, rubber (WP 0180, Table 1, Item 17)

Equipment Condition

ECU Shut Down
Power Source – Off
ECU Power cable disconnected
from Power Source

WARNING**HEAVY EQUIPMENT**

The ECU weighs 520 lbs. Use only a mechanical lift to move equipment. Do not attempt to lift, carry, or move the ECU without a mechanical lift. Failure to observe this warning can result in serious injury or death to personnel.

Prior to removing the ECU verify that the HP-2C/185 UST Trailer on level ground and cage bolts are not inserted and wheels are chocked. Failure to do so can result in serious injury and equipment damage from unplanned rollout of the ECU.

Once the ECU is removed, do not allow unit to hang from lifting device. Place on level ground until ready to replace. Failure to observe this warning can result in serious injury or death to personnel or damage to ECU.

If ECU has been in operation, fluids and components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for fluids and components to warm up/cool down before performing procedures.

High voltage and amperage present at electrical connections. Ensure that all switches and circuit breakers have been de-energized prior to performing any procedures.

REMOVAL - Continued

1. Prior to performing the following steps ensure that:
 - ECU is shut down in accordance with ECU Shut Down Procedure (WP 0005)
 - ECU is at ambient temperature
 - Duct work is disconnected and duct covers are installed on ECU.
 - Genset is shut down in accordance with Genset Shut Down Procedure (WP 0005)
 - Trailer is level
 - Wheels are chocked
 - Ample room to perform the following procedure is present
 - Area immediately around ECU is free and clear of items (i.e., Storage bags, grounding, etc.)
2. Disconnect the ECU power cable (Figure 1, Item 1) from the Genset or from a shore power supply.
3. Unlatch and remove rear access panel and set aside.
4. Loosen two tie wraps (Figure 1, Item 5) located on underside of ECU and remove two drip valves (Figure 1, Item 6).
5. Using a suitable lifting device attach chain/sling to the four lifting eyes (Figure 1, Item 7) on the ECU. Raise the lift only far enough to place tension (no slack) on the chain.
6. Remove and retain four bolts, (Figure 1, Item 8), lock washers (Figure 1, Item 10) and flat washers (Figure 1, Item 9) from underside of ECU.

NOTE

When performing the following step, ensure that area where ECU is to be placed is dry and level. Ensure that supports allow adequate room below ECU for drainage of ECU and so that no items on bottom of ECU become damaged.

7. Place supports (i.e., 4x4 treated lumber) along ground for ECU to be placed on once removed from trailer.

CAUTION

When performing the following step, guides should be observant of ECU to ensure no pieces from ECU and/or trailer get caught while lifting is in process.

When performing the following step, guides should be observant of ECU to ensure supports are properly placed and that nothing on ECU gets damaged when placing ECU onto supports.

8. Using appropriately trained personnel, lift ECU off of trailer base and place on supports. Once ECU is safely lowered, remove chain/sling.

END OF TASK

REPLACEMENT

1. Using a suitable lifting device, attach chain/sling to the four lifting eyes (Figure 1, Item 7) on the ECU. Raise the lift only far enough to place tension (no slack) on the chain.

CAUTION

When performing the following step, guides should be observant of ECU to ensure safety of personnel and that no pieces from ECU and/or trailer get caught/damaged while lifting is in process.

NOTE

When performing the following step:

- Ensure that ECU is properly orientated for placement on trailer (evaporator panel should be on same side of trailer as control panel(s) of Genset).

NOTE

- Lower ECU close enough to trailer to allow slight movement for alignment of hardware during installation.
 - Be aware of all items on underside of ECU (i.e., drains).
2. Using appropriately trained personnel, lift ECU off of ground and place on trailer. Do not disconnect from chains/sling until directed to do so.
 3. Install four bolts (Figure 1, Item 8), lock washers (Figure 1, Item 10) and flat washers (Figure 1, Item 9) through trailer frame and to underside of ECU. Hand tighten bolts at this time.
 4. Finish lowering ECU onto trailer. Tighten all bolts previously installed. Remove chain/sling.
 5. Install two drip valves (Figure 1, Item 6) located on underside of ECU and secure with tie wrap (Figure 1, Item 5).
 6. Connect the ECU power cable (Figure 1, Item 1) to the Genset or to shore power.
 7. Start Genset in accordance with Genset Start Procedure (WP 0005).
 8. Start ECU in accordance with ECU Start Procedure (WP 0005).

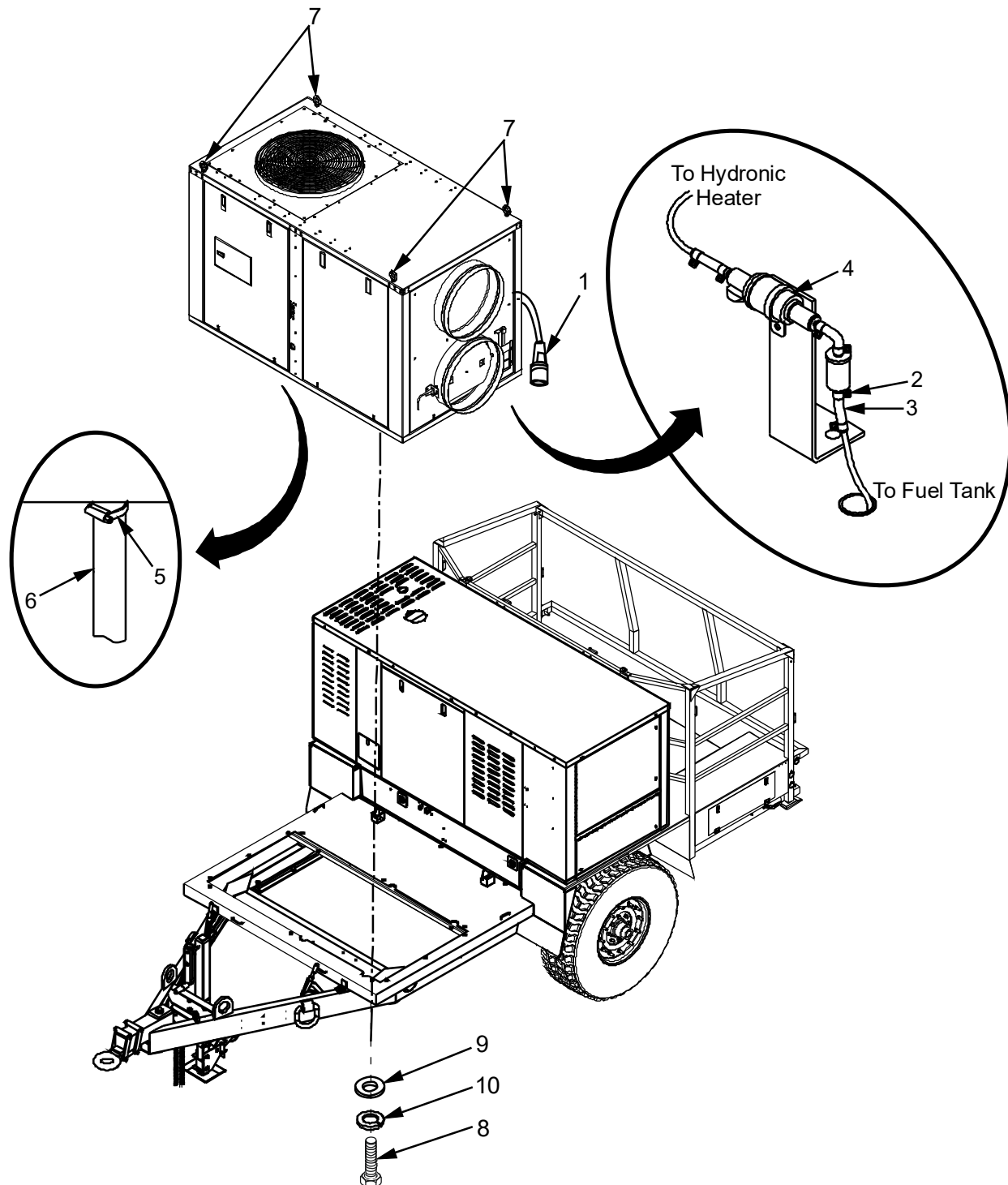


Figure 1. ECU Remove and Replace.

END OF TASK

END OF WORK PACKAGE

CHAPTER 8

MAINTAINER MAINTENANCE INSTRUCTIONS

FOR

HP-2C/185 UST TRAILER

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
PMCS INTRODUCTION – TRAILER

GENERAL

This work package provides data necessary to keep the HP-2C/185 UST Trailer operational ready. PMCS are performed to keep the HP-2C/185 UST Trailer in operational condition. The checks are used to find, correct, and report problems. Maintenance personnel are required to perform the tasks as indicated in Maintainer PMCS (WP 0110, Table 1). PMCS are performed the Maintainer each time the equipment is operated. Prior to performing maintenance that requires climbing on or under HP-2C/185 UST Trailer, ensure cage bolts are not inserted and wheels are chocked. Injury to personnel could result from HP-2C/185 UST Trailer suddenly rolling or tipping.

Before you begin operating the HP-2C/185 UST Trailer and/or its equipment, do Before PMCS.

Once a week do Weekly PMCS. If HP-2C/185 UST Trailer has not been operated in a week, perform Before PMCS.

Do Monthly PMCS once a month. If HP-2C/185 UST Trailer has not been operated in a month, perform PMCS as outlined in (WP 0110).

If you are operating the HP-2C/185 UST Trailer for the first time, perform Weekly and Monthly PMCS the first time you do your Before PMCS.

If you find something wrong when performing PMCS, fix it if you can. Otherwise, notify your supervisor.

WARNINGS AND CAUTIONS

Special attention should be paid to the WARNINGS and CAUTIONS appearing in the Maintainer PMCS table. A WARNING means someone could be injured. A CAUTION means equipment could be damaged.

LEAKAGE DEFINITION

It is necessary for you to know how fluid leakage affects the status of the trailer. The following are definitions of the classes of leakage you need to know to be able to determine the status of the trailer. Learn these leakage definitions when in doubt contact your supervisor.

CAUTION

Maintainers must perform appropriate maintenance when Operators report Class III leaks. Failure to comply may result in damage to equipment.

NOTE

The following note applies to non-flammable liquids only. Any leakage of flammable liquid is unacceptable.

Equipment operation is allowable with minor leakages (Class I or II). Consideration must be given to fluid capacity of the item or system being checked. When Maintainer is in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.

LEAKAGE DEFINITION – Continued

CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

CLASS II - Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.

CLASS III - Leakage of fluid great enough to form drops that fall from the item being checked.

INSPECTION

Look for signs of a problem or trouble. Senses help here. You can feel, smell, hear, or see many problems. Be alert when on the HP-2C/185 UST Trailer.

Inspect to see if components are in good condition. Are they correctly assembled, stowed, and secured, or excessively worn, leaking, corroded, or damaged? Correct any problems found or notify your supervisor.

There are some common items to check all over the HP-2C/185 UST Trailer. These include the following:

1. Bolts, clamps, nuts, and screws: Continuously check for looseness. Look for chipped paint, rust, or corrosion around bolt and screw heads and nuts. Tighten them when you find them loose. If tools are not available, notify your supervisor.
2. Welds: Many items on the HP-2C/185 UST Trailer are welded. To check these welds, look for chipped paint, rust corrosion, or gaps. When these conditions exist, Maintainer must notify their supervisor.
3. Electrical wires, connectors, and harnesses: Tighten loose connectors. Look for cracked or broken insulation, bare wires, and broken connectors. If any damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.
4. Hoses and fluid lines: Look for wear, damage and leaks, and make sure clamps and fittings are tight. Wet spots mean a leak. A stain by a fitting or connector can also mean a leak. If any leaks or damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.
5. Tires, and associated brake components. Look for excessive wear and damage. Check tires for excessive or un-even wear. Check brake shoes and all associated components for leaks, excessive wear or damage. If excessive/ un-even wear or damage is found, Maintainer must repair/replace as required. If beyond Maintainer Level Maintenance, Maintainer must notify their supervisor.

LUBRICATION MAINTAINER INTERVALS - NORMAL CONDITIONS

General

For safer, more trouble-free operations, make sure that your HP-2C/185 UST Trailer is serviced when it needs it. Proper maintenance intervals which are the responsibility of the Maintainer level maintenance are found in this chapter.

Adherence

Intervals (on-condition or hard time) and the related man-hour times are based on normal operation. The man-hour time specified is the time needed to do all the maintenance prescribed for a particular interval. On-condition (OC) oil sample intervals shall be applied. Change the hard time interval if lubricants are contaminated or if operating the equipment under adverse operating conditions, included longer-than-usual operating hours. The calendar interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken. Hard time intervals must be applied during the warranty period.

Cleaning Fittings Before Lubrication

WARNING

Cleaning solvents may be toxic and flammable. Wear protective goggles and gloves; use only in well-ventilated area; avoid contact with skin, eyes, and clothes, and do not breath vapors. Keep away from heat or flame. Never smoke when using cleaning solvent. Failure to comply may result in serious injury or death to personnel.

If personnel become dizzy while using cleaning solvents, immediately get fresh air and medical help. If cleaning solvent contacts skin or clothes, flush with cold water. If cleaning solvent contacts eyes, immediately flush eyes with water and get medical attention. Failure to comply may result in serious injury or death to personnel.

Clean parts with cleaning solvent. Dry before lubricating.

Lubrication After Fording

If a fording operation occurs, lubricate all fittings below fording depth and check submerged gear boxes for presence of water.

Lubrication After High Pressure Washing

After a thorough washing, lubricate all grease fittings and oil can points outside and underneath trailer.

Corrosion Control

Refer to (WP 0001), Corrosion Prevention and Control (CPC), for appropriate corrosion control procedures.

Hard Time Lubrication Intervals

For equipment under manufacturer's warranty, hard time lubrication intervals shall be followed. Intervals shall be shortened if lubricants are known to be contaminated or if operation is under adverse conditions (e.g. longer than usual operating hours, extended idling periods, extreme dust).

EXPLANATION OF TABLE ENTRIES

Item Number - Numbers in this column are for reference. When completing DA Form 2404/DA Form 5988E (Equipment Inspection and Maintenance Worksheet), include the item number for the check/service indicating a fault. Item numbers appear in the order in which the checks/services are performed for the interval listed.

Interval - This column indicates when a procedure must be performed (i.e., Before, During, After, Monthly).

Item to Be Checked or Serviced - This column provides the item that is to be checked or serviced.

Procedure - This column describes the procedure that must be followed to ensure that the equipment is capable of performing its intended mission.

Equipment Not Ready/Available If - This column lists conditions that make the HP-2C/185 UST Trailer not fully mission capable. If possible, fix the problem using the troubleshooting procedures and/or maintenance procedures in this manual. If not, document the items not able to be fixed on DA Form 2404 for the next level of maintenance. For further information on how to use this form, see DA PAM 750-8. Be sure to observe and annotate all special circumstances that appear/occur.

Other Entries - Be sure to observe and annotate all special circumstances that appear/occur.

NOTE

If the equipment must be kept in continuous operation, only perform those procedures that will not disturb operation. Complete checks and services when the equipment is shut down.

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
PMCS (TRAILER)

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (2)**Materials/Parts**

None Required

References

WP 0124 - WP 0134

Equipment ConditionTrailer parked & wheels chocked
ECU Shut Down
Genset Shut Down

Table 1. Maintainer Preventive Maintenance Checks and Services – Trailer.

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1	Monthly	TRAILER	<p style="text-align: center;">NOTE</p> <p>Refer to (WP 0099 through WP 0109) for trailer maintenance procedures.</p> <p>1. Check wheels and tires for damage, foreign objects, lose or missing lug nuts, or unusual tread wear. Verify that tire pressure is correct. Highway: 20 psi Off Road: 17 psi Replace tire if necessary.</p> <p>2. Check trailer brakes to include master cylinder. Ensure that trailer brakes are in proper working order.</p>	<p>Wheels/tires damaged, extreme wear, lug nuts missing/not properly tightened. Tires unserviceable.</p> <p>Brakes/master cylinder not in proper working order.</p>

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1 (Cont.)	Monthly	TRAILER	<p>3. Check brake hoses. Ensure that hoses are not collapsed, swollen, excessively soft, or spongy. Ensure that no damage, to include cracks excessive wear is present. Check connections to ensure that no leakage of brake fluid, excessive corrosion, or other wear is present.</p> <p>4. Check brake fluid. Ensure that brake fluid is full and is not contaminated. If necessary, add brake fluid.</p> <p>NOTE</p> <p>The following step must be performed with the trailer connected to a vehicle.</p> <p>5. Check brake lights for functionality.</p>	<p>Brake hoses damaged, leaking, excessive cracking present.</p> <p>Brake fluid reservoir low on fluid/leaking or fluid is contaminated.</p>

ITEM NO.	INTERVAL	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1 (Cont.)	Monthly	TRAILER	<p>WARNING</p> <p>When performing the following step, DO NOT attempt to pull trailer beyond point where cables, duct work, and other items would be damaged.</p> <p>CAUTION</p> <p>Prior to performing the following step, ensure that dolly wheel assembly is raised, safety chain is engaged, and parking brakes are released.</p> <p>6. Attempt to tow trailer with vehicle. Trailer should NOT drag.</p> <p>7. Check safety chains for insecure mounting, damage, corroded, or loose hardware. Replace/repair if necessary.</p> <p>8. Check for missing or damaged, lens lights. Replace/repair if necessary.</p> <p>9. Check condition of skid plate/dolly wheel assembly for proper mounting to landing post or tongue jack. Repair or replace if necessary.</p> <p>10. Check crank handle for proper operation. Verify that no corrosion is present on mechanism. Grease if necessary.</p> <p>11. Attempt to tow trailer with vehicle. Trailer should NOT drag.</p>	<p>Wheels are locked up/ do not turn.</p> <p>Safety chains loose, damaged, corroded, or missing.</p> <p>Lens light or hardware loose, corroded, or missing.</p> <p>Skid plate/dolly wheel tongue jack missing or inoperative.</p> <p>Crank handle damaged, missing, or inoperative.</p> <p>Wheels are locked up/ do not turn.</p>

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST TRAILER
TRAILER MAINTENANCE INDEX

GENERAL

This section contains an index of repair/removal/replacement or maintenance procedures that may be needed during maintenance or repair of the HP-2C/185 UST Trailer by Maintainer personnel. Maintenance is limited to those failures that may be repaired at the Maintainer level. The index identifies the maintenance function, which is followed by a column that identifies the work package and page(s) where Maintainer level procedure(s) may be found. The index is provided to assist in the quick location of a procedure. The manual cannot list all malfunctions that may occur. If a malfunction is encountered that is not listed or that cannot be corrected by the corrective actions provided, notify the supervisor.

Maintenance Function**Procedure**

TRAILER		
1.	Trailer level removal/replacement	0124-2
2.	Safety chain removal/replacement	0124-3
3.	Tongue jack assembly removal/replacement	0124-4
4.	Lift sling removal/replacement	0125-2
5.	Stabilizer leg removal/replacement	0126-2
6.	Cargo net removal/replacement	0126-5
7.	Reflector removal/replacement	0127-2
8.	Ground stud removal/replacement	0127-4
9.	Lanyard assembly removal/replacement	0127-6
10.	Fire extinguisher bracket removal/replacement	0127-8
11.	Cargo restraint cage removal/replacement	0128-2
12.	Vehicle stop light lamp (incandescent) and blackout light removal/replacement/test ...	0129-2
13.	Vehicle stop light (incandescent) removal/replacement/test	0129-4
14.	Vehicle stop light (LED) removal/replacement/test	0129-6
15.	Vehicle stop light wiring harness (inter-vehicular cable) removal/replacement/test	0130-2
16.	Brake hub/drum removal/clean and inspect/replacement	0131-2
17.	Wheel cylinder removal/clean and inspect/replacement	0131-6
18.	Brake shoe removal/clean and inspect/replacement	0131-9
19.	Backing plate removal/replacement	0131-13
20.	Brake adjustment	0131-15
21.	Master cylinder removal/replacement	0132-2
22.	Brake line removal/replacement	0132-4
23.	Bleed brake system	0132-8
24.	Brake actuator components removal/replacement	0133-4
25.	Brake actuator assembly removal/replacement	0133-9
26.	Hand brake assembly removal/inspect/replacement	0133-11
27.	Hand brake cable and sheath removal/replacement	0133-14
28.	Tire and wheel assembly service/removal/replacement	0134-2

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER LEVEL, SAFETY CHAIN, AND TONGUE JACK

GENERAL

This work package provides information on the removal and replacement of the trailer level, safety chain, and tongue jack assembly. It consists of:

- Trailer level removal/replacement
- Safety chain removal/replacement
- Tongue jack assembly removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

TRAILER LEVEL REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (1)**Materials/Parts**

Level

References

None

Equipment ConditionTrailer parked & wheels chocked

REMOVAL

1. Remove and retain three screws (Figure 1, Item 2).
2. Remove and properly discard of level (Figure 1, Item 1).

REPLACEMENT

1. Install level (Figure 1, Item 1) secure to trailer using three screws (Figure 1, Item 2).

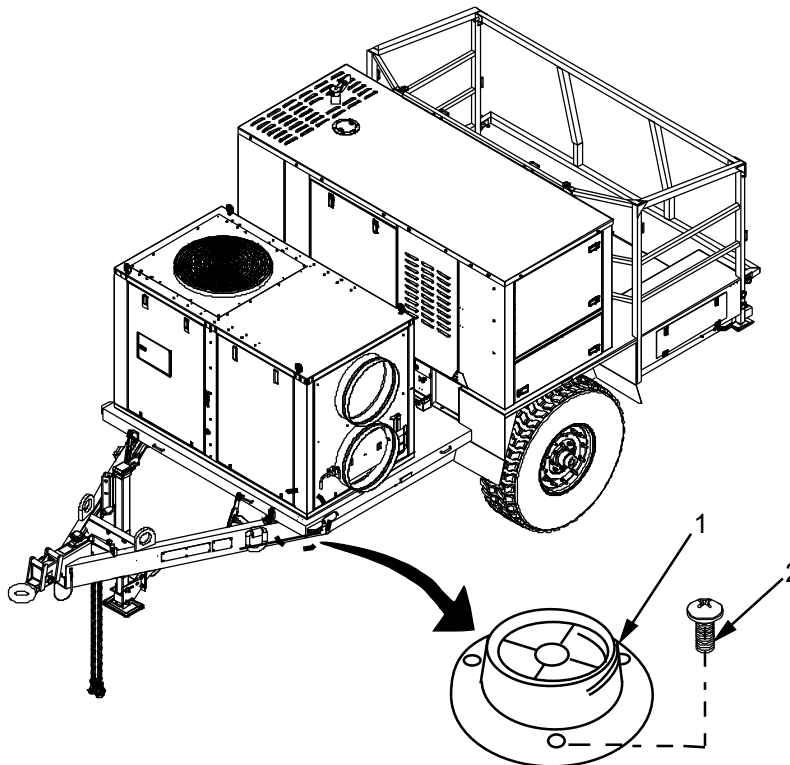


Figure 1. Trailer Level Removal/Replacement.

END OF TASK

SAFETY CHAIN REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (1)**Materials/Parts**Safety chain
Pin (w/retainer)**References**

None

Equipment ConditionTrailer parked & wheels chocked

REMOVAL

1. Identify safety chain (Figure 2, Item 1) requiring replacement.
2. Rotate locking ring (Figure 2, Item 2) and remove locking pin (Figure 2, Item 3).
3. Remove safety chain (Figure 2, Item 1) from slot in trailer frame.

REPLACEMENT

1. Insert safety chain (Figure 2, Item 1) into slot in trailer frame.
2. Insert locking pin (Figure 2, Item 3) through safety chain (Figure 2, Item 1).
3. Secure safety chain (Figure 2, Item 1) by rotating locking ring (Figure 2, Item 2) over locking pin (Figure 2, Item 3).

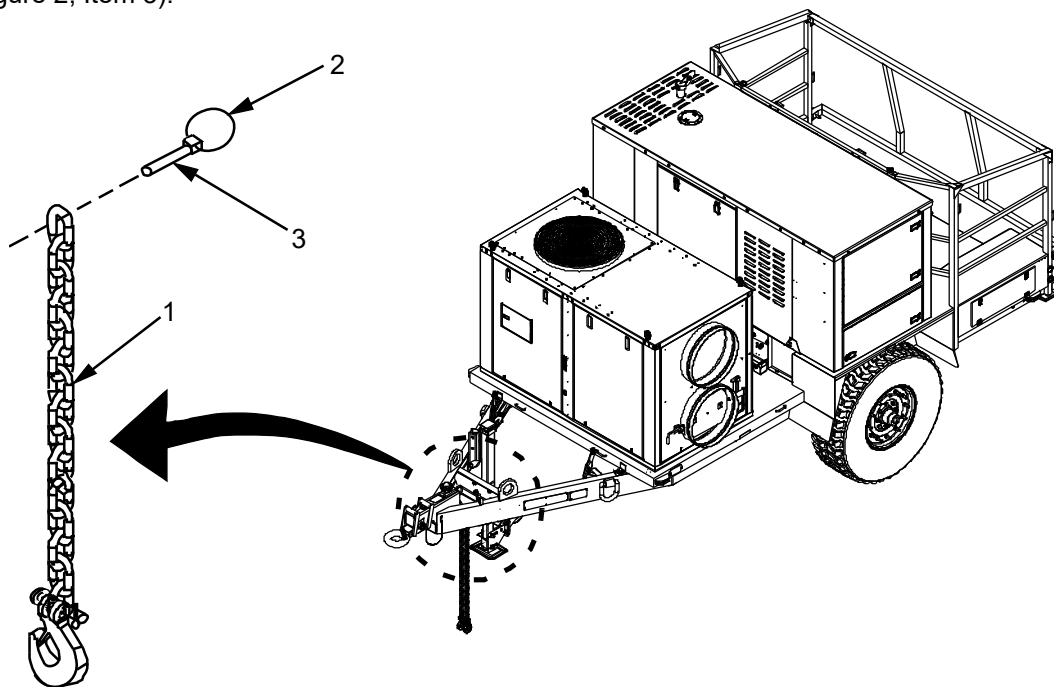


Figure 2. Safety Chain Removal/Replacement.

END OF TASK

TONGUE JACK ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (1)**Materials/Parts**Tongue jack assembly
Grease (WP 0180, Item 25)**References**

None

Equipment ConditionTrailer parked & wheels chocked

REMOVAL

1. Attach trailer to vehicle or stationary trailer stand.
2. Verify that both trailer wheels are chocked, hand brakes are locked and stabilizer leg not being changed is in its shortest positions.
3. Raise tongue jack assembly (Figure 3, Item 1) until skid plate assembly (Figure 3, Item 3) is off the ground.
4. Remove two mounting pins (Figure 3, Item 4) and remove skid plate assembly (Figure 3, Item 3).

NOTE

If replacing only the skid plate assembly (Figure 3, Item 3) by-pass step 5.

5. Remove four bolts (Figure 3, Item 2) and lock nuts (Figure 3, Item 5) from tongue jack assembly (Figure 3, Item 1)
6. Remove tongue jack assembly (Figure 3, Item 1).

REPLACEMENT**NOTE**

Ensure tongue jack assembly (Figure 3, Item 1) is compressed to the fully closed position.

1. Install tongue jack assembly (Figure 3, Item 1) and secure to trailer assembly with four bolts (Figure 3, Item 2) and lock nuts (Figure 3, Item 5).
2. Install skid plate assembly (Figure 3, Item 3) and secure to tongue jack assembly (Figure 3, Item 1) with two mounting pins (Figure 3, Item 4)

REPLACEMENT – Continued.**NOTE**

If necessary, grease tongue jack assembly (Figure 3, Item 1).

3. Raise and lower tongue jack assembly (Figure 3, Item 1) to verify operation.
4. Lower tongue jack assembly (Figure 3, Item 1) until the skid plate assembly (Figure 3, Item 3) on the ground.
5. Raise the trailer using the tongue jack assembly (Figure 3, Item 1), remove tow vehicle or trailer stand and level trailer.

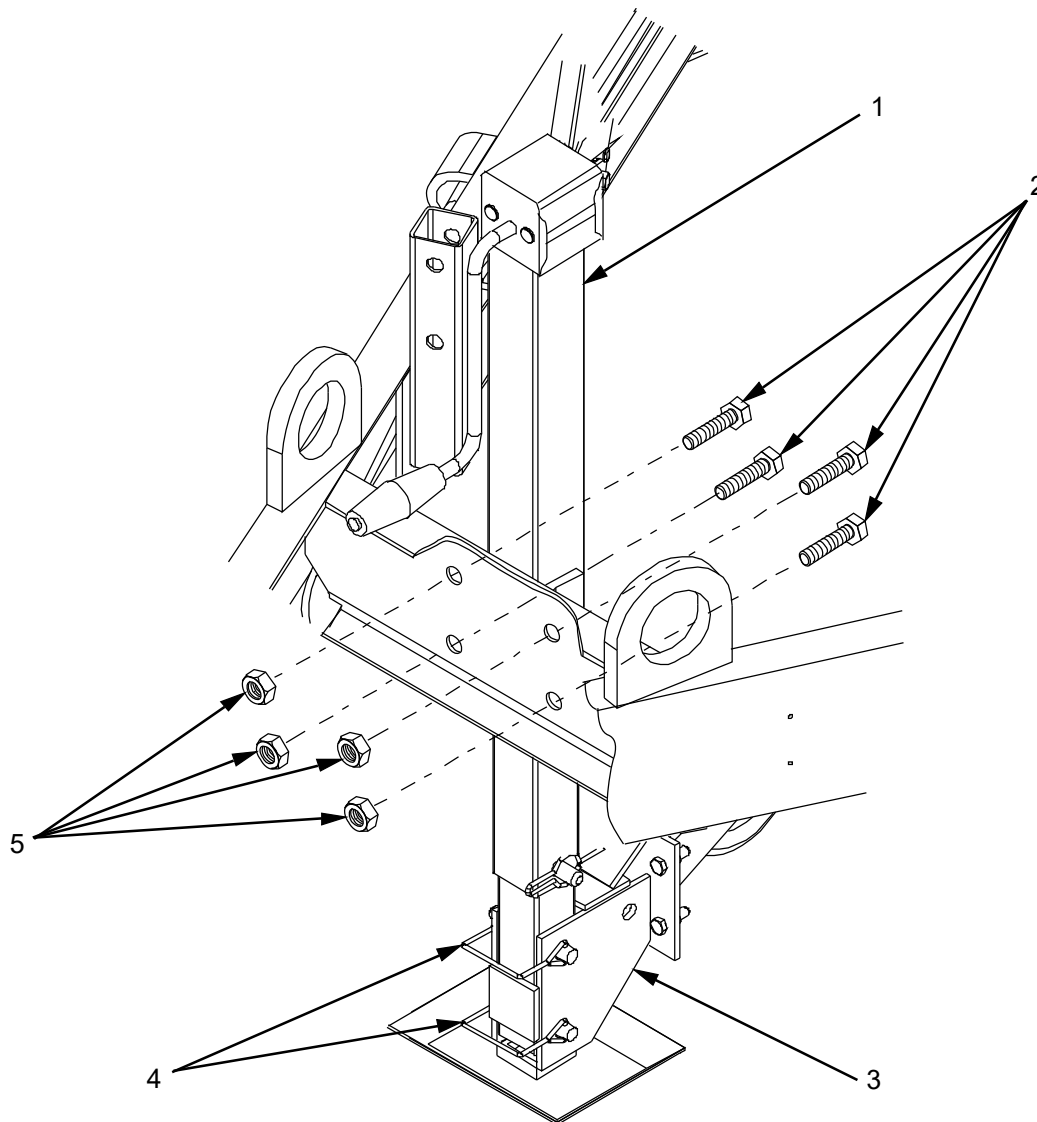


Figure 3. Tongue Jack Assembly Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER LIFT SLING

GENERAL

This work package provides information on the removal and replacement of the front and rear trailer lift slings.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

LIFT SLING REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General Mechanics Tool Kit (WP 0132, Table 2, Item 1)
Common No.1 shop set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Lift sling

References

WP 0005

Equipment Condition

Trailer parked & wheels chocked
ECU shut down
Genset shut down

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Prior to performing the following procedure ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

CAUTION

Prior to performing the following procedure ensure that HP-2C/185 UST Trailer is out of service. No power cables or duct should be connected to the ECU or Genset. Failure to observe this caution could result in serious damage to the HP-2C/185 UST Trailer and/or its contents.

REMOVAL

1. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
2. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Shut Down Procedure).

NOTE

If replacing trailer bed lift sling, remove equipment from trailer bed.

3. Remove two hex bolts (Figure 1, Item 1) from lift sling (Figure 1, Item 2).

NOTE

Front lift slings have a detachable mounting block (Figure 1, Item 4) within the trailer frame. Secure mounting block (Figure 1, Item 4) when removing hardware and set aside.

Rear lift slings have a permanent mounting block attached beneath trailer bed (Figure 1, Item 3).

4. Pull lift sling (Figure 1, Item 2) up from trailer superstructure.

END OF TASK**REPLACEMENT**

1. Position lift sling (Figure 1, Item 2) over bolt holes in trailer superstructure.
2. Install two hex bolts (Figure 1, Item 1) into lift sling (Figure 1, Item 2) and through trailer superstructure.

NOTE

Front lift slings have a detachable mounting block (Figure 1, Item 4). Align mounting block with hardware within frame.

Rear lift slings have a permanent mounting block attached beneath trailer bed (Figure 1, Item 3).

3. Tighten bolts (Figure 1, Item 1).
4. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
5. Verify that ECU power cable is connected to the Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

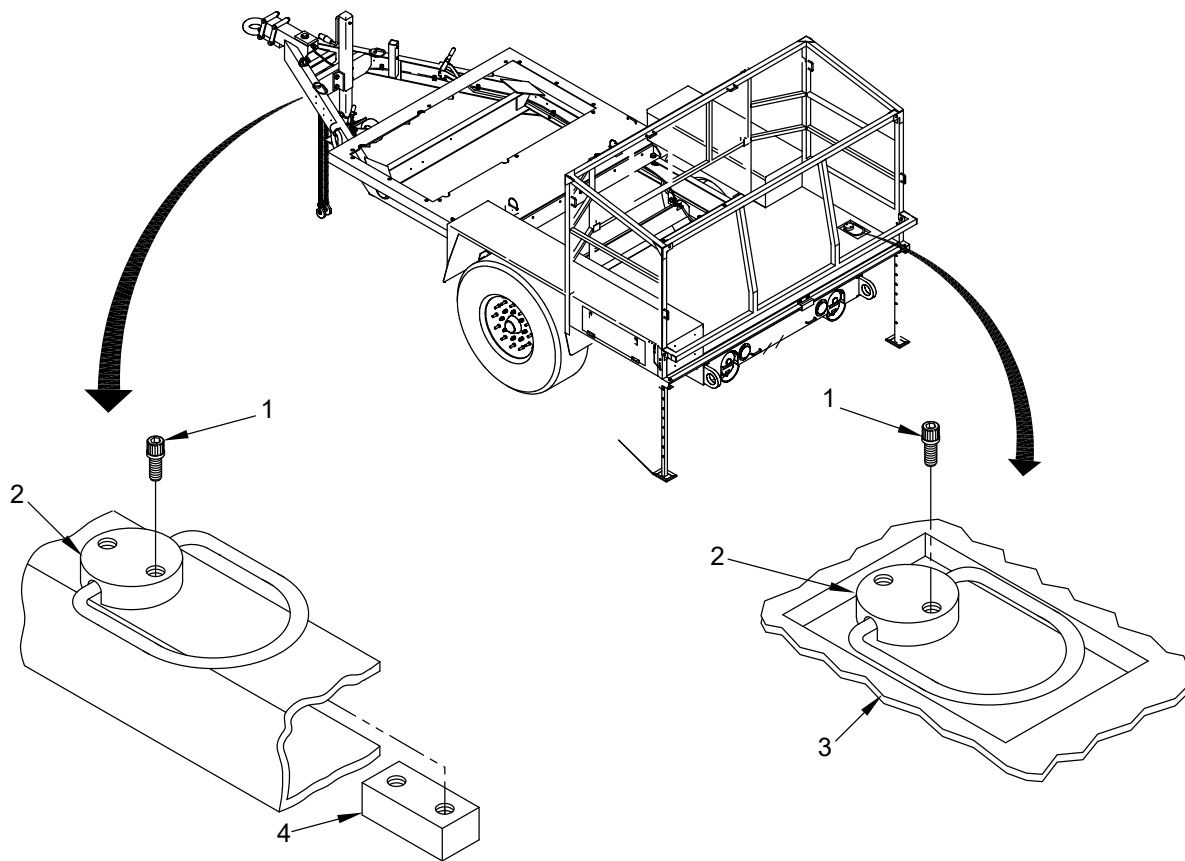


Figure 1. Lift Sling Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER STABILIZER LEG AND CARGO NET

GENERAL

This work package provides information on the removal and replacement of the HP-2C/185 UST Trailer stabilizer leg and cargo net. It consists of:

- Stabilizer leg removal/replacement
- Cargo net removal/replacement

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under the HP-2C/185 UST Trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the trailer and/or its contents.

STABILIZER LEG REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

5 ton floor jack

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (1)**Materials/Parts**

Stabilizer leg

References

WP 0005

Equipment ConditionTrailer handbrakes engaged
Trailer parked & wheels chocked
ECU shut down
Genset shut down

WARNING

When the following procedure is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the trailer and/or its contents.

Personnel performing this procedure should have another person nearby incase an adverse situation occurs. Failure to observe this warning can result in serious injury or death to personnel or damage to the trailer and/or its contents.

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Prior to performing the following procedure ensure that trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

CAUTION

Prior to performing the following procedure ensure that trailer is out of service. No power cables or duct should be connected to the ECU or Genset. Failure to observe this caution could result in serious damage to the trailer and/or its contents.

REMOVAL

1. Remove all loose items from trailer and cargo area.
2. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).

REMOVAL – Continued

3. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Shut Down Procedure).
4. Verify that ducts are disconnected from ECU and all cables are disconnected from Genset and ECU.
5. Raise both stabilizer legs (Figure 1, Item 4) to the fully stowed position.
6. Verify that opposite trailer wheel is chocked and hand brakes are locked.
7. Ensure skid plate (Figure 1, Item 6) is in the down position and dolly wheel is facing rear of trailer.
8. Remove pin (Figure 1, Item 7) and raise tongue jack assembly (Figure 1, Item 1) to highest position to lower tongue assembly to lowest point.
9. Position floor jack (Figure 1, Item 5) beneath trailer axle on same side as stabilizer leg being replaced.
10. Remove two locking pins (Figure 1, Item 2) that secure the trailer stabilizer leg (Figure 1, Item 4) being replaced and lower stabilizer leg as far as possible.
11. Raise floor jack (Figure 1, Item 5) until sufficient height is attained to remove stabilizer leg (Figure 1, Item 4) from receptacle (Figure 1, Item 3) on trailer.

END OF TASK**REPLACEMENT**

1. Insert stabilizer leg (Figure 1, Item 4) into receptacle (Figure 1, Item 3) on trailer and raise stabilizer leg to the fully stowed position.
2. Insert two locking pins (Figure 1, Item 2) and secure stabilizer leg (Figure 1, Item 4).
3. Lower and remove floor jack (Figure 1, Item 5).
4. Adjust the tongue jack assembly (Figure 1, Item 1) and stabilizer legs (Figure 1, Item 4) to appropriate operational height. Replace pin (Figure 1, Item 7) in tongue jack assembly (Figure 1, Item 1).
5. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
6. Verify that ECU power cable is connected to J1 of Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

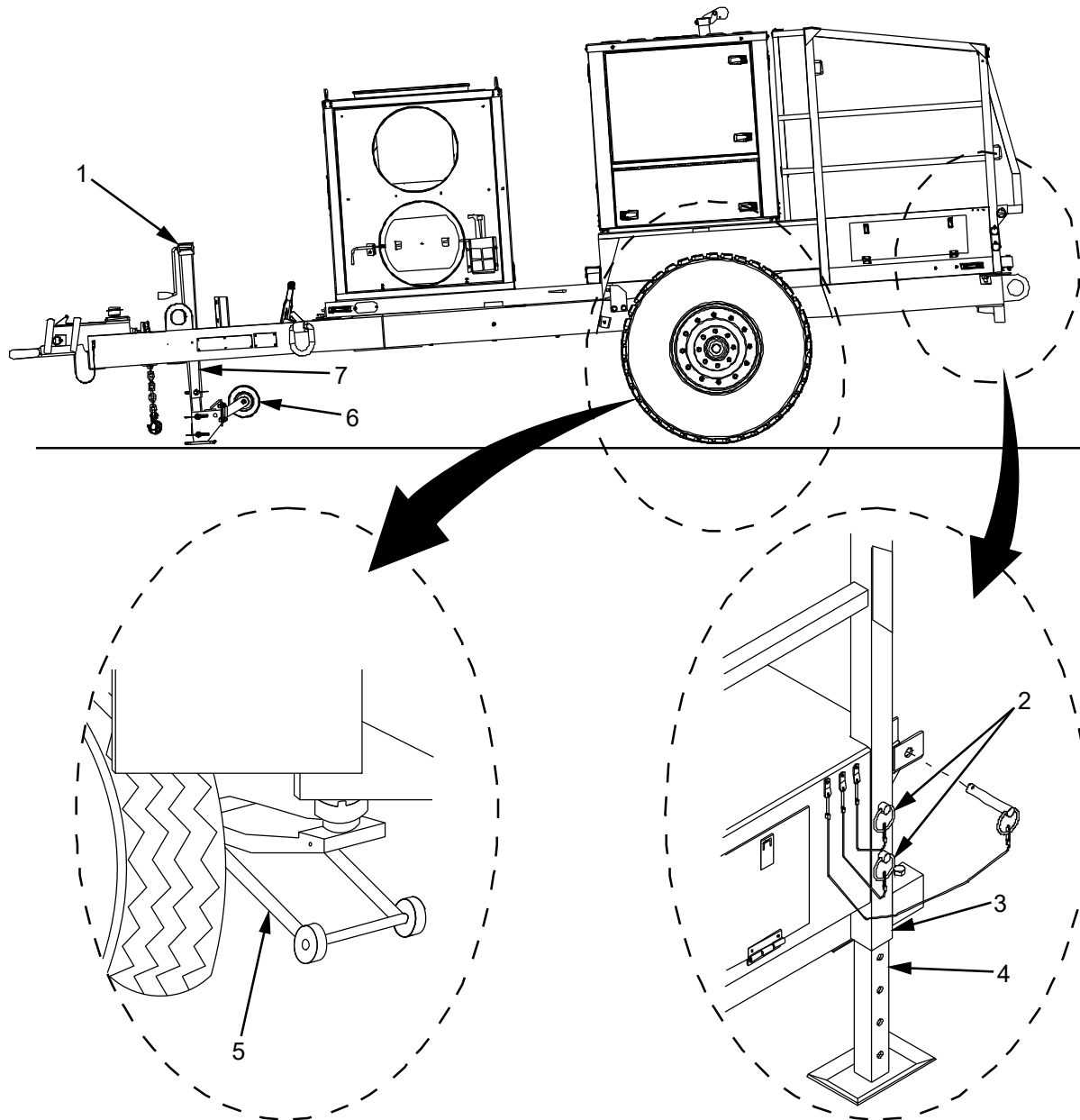


Figure 1. Stabilizer Leg Removal/Replacement.

END OF TASK

CARGO NET REMOVAL/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (1)**Materials/Parts**

Cargo net

References

WP 0005

Equipment ConditionTrailer handbrakes engaged
Trailer parked & wheels chocked

REMOVAL

1. Disconnect six quick disconnects (Figure 2, Item 9) that secure cargo net (Figure 2, Item 8).
2. Remove and retain two bolts (Figure 2, Item 1), four flat washers (Figure 2, Item 3), and two lock nuts (Figure 2, Item 4) that secure mounting pole (Figure 2, Item 2) to trailer frame.
3. Remove and retain four bolts (Figure 2, Item 7), eight flat washers (Figure 2, Item 6), and four lock nuts (Figure 2, Item 10) that secure center bracket (Figure 2, Item 5) to trailer frame.
4. Remove and retain center bracket (Figure 2, Item 5).
5. Remove mounting pole (Figure 2, Item 2) and cargo net (Figure 2, Item 8) from trailer frame.
6. Remove cargo net (Figure 2, Item 8) from mounting pole (Figure 2, Item 2). Retain mounting pole (Figure 2, Item 2) and properly discard cargo net (Figure 2, Item 8).

END OF TASK**REPLACEMENT**

1. Insert mounting pole (Figure 2, Item 2) into loops on cargo net (Figure 2, Item 8).
2. Secure mounting pole (Figure 2, Item 2) and cargo net (Figure 2, Item 8) to trailer frame with two bolts (Figure 2, Item 1), four flat washers (Figure 2, Item 3), and two lock nuts (Figure 2, Item 4).
3. Install center bracket (Figure 2, Item 5) to trailer frame and secure with four bolts (Figure 2, Item 7), eight flat washers (Figure 2, Item 6), and four lock nuts (Figure 2, Item 10).
4. Secure cargo net (Figure 2, Item 8) to trailer with six quick disconnects (Figure 2, Item 9).

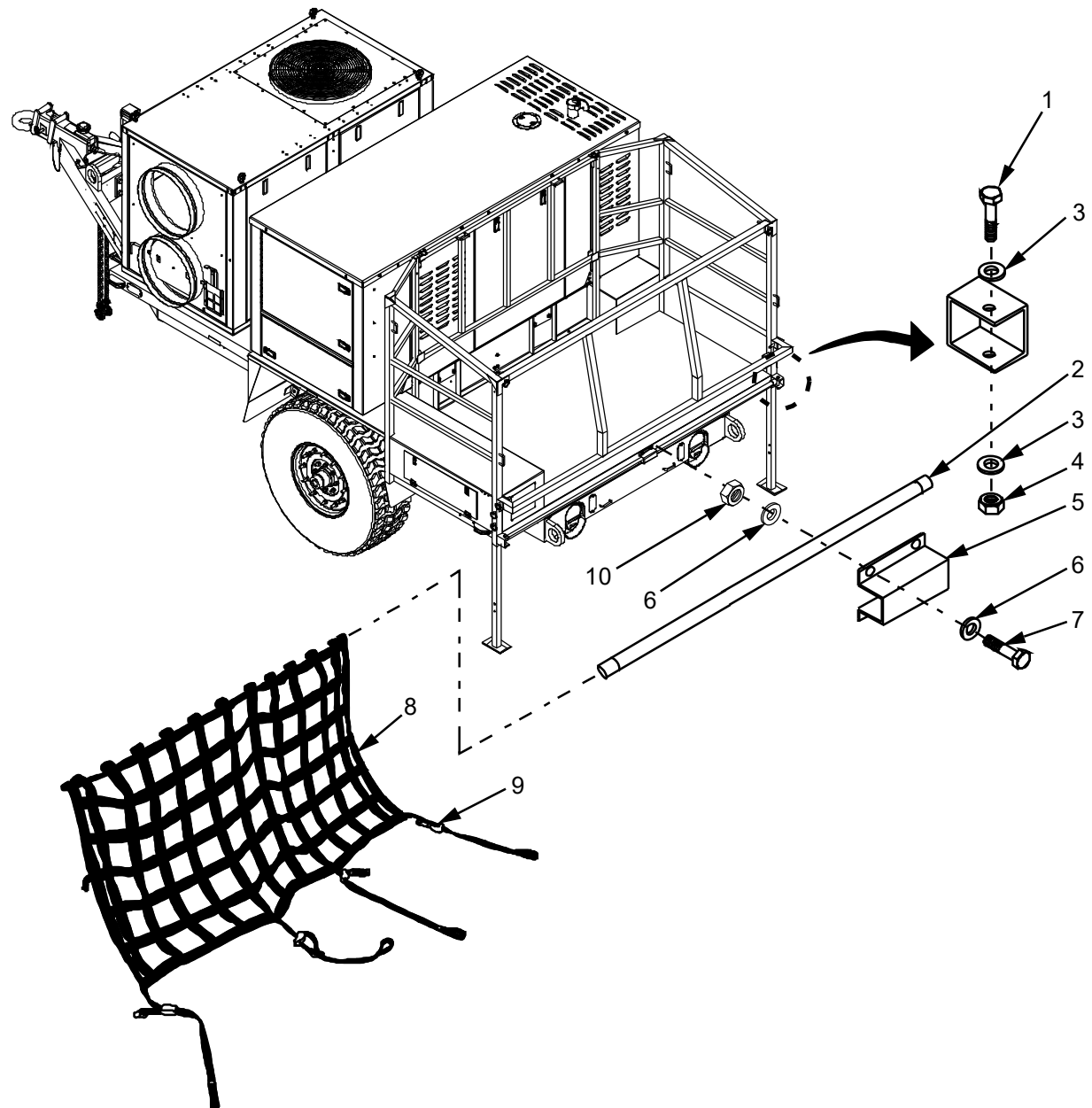


Figure 2. Cargo Net Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER BASIC FIELD MAINTENANCE

GENERAL

This work package provides information on the removal and replacement of the following components:

- Reflector removal and replacement
- Ground stud removal and replacement
- Lanyard assembly removal and replacement
- Fire extinguisher bracket removal and replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, ensure handbrakes are engaged and wheels are chocked. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

REFLECTOR REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Reflector

References

WP 0005

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

CAUTION

Be aware of wiring harness behind reflectors when drilling or damage may result.

NOTE

This procedure applies to all reflectors at various locations of the trailer.

REMOVAL

1. Unload any ancillary devices from trailer that will interfere with replacement of reflector.
2. Drill out the center of the two rivets (Figure 1, Item 2) securing reflector (Figure 1, Item 3) to the trailer superstructure (Figure 1, Item 1) using a 3/16" drill bit.
3. Remove reflector (Figure 1, Item 3).

END OF TASK**REPLACEMENT**

1. Insert new rivets (Figure 1, Item 4) through reflector (Figure 1, Item 3) and through mounting holes in the superstructure of the trailer (Figure 1, Item 1).
2. Using rivet gun, lock rivets (Figure 1, Item 4) into place.
3. Reload ancillary devices in trailer.

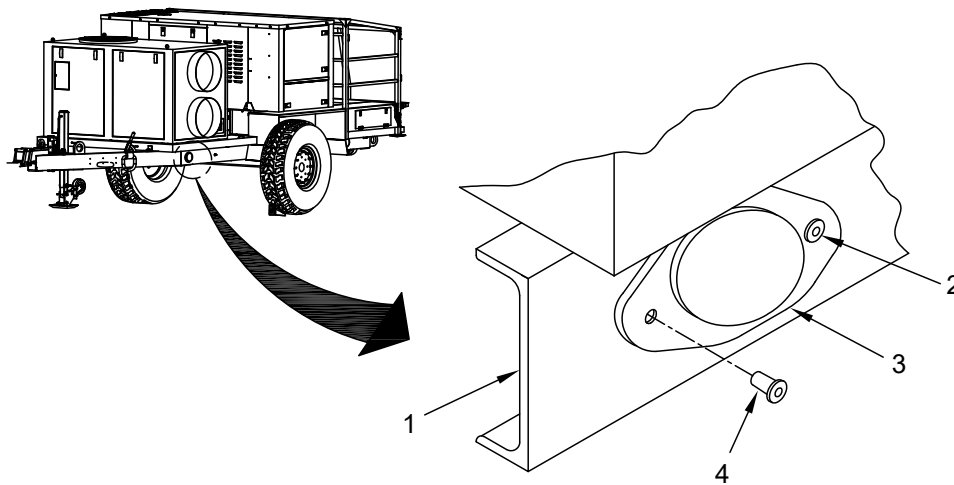
REPLACEMENT – Continued

Figure 1. Reflector Removal/Replacement.

END OF TASK

GROUND STUD REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Ground bolt and hardware

References

WP 0005

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

REMOVAL

1. Remove wing nut (Figure 2, Item 7), nut (Figure 2, Item 6), lock washer (Figure 2, Item 5), and finishing washer (Figure 2, Item 4) from ground bolt (Figure 2, Item 1).
2. Remove ground bolt (Figure 2, Item 1), washer (Figure 2, Item 2), and ground wire(s) (Figure 2, Item 8) from trailer superstructure (Figure 2, Item 3).

END OF TASK**REPLACEMENT****NOTE**

Prior to beginning the following step, ensure area around hole is free of paint, grease, dirt, and other debris that would prevent a good electrical connection.

1. Insert ground bolt (Figure 2, Item 1), washer (Figure 2, Item 2), and ground wire(s) (Figure 2, Item 8) to trailer superstructure (Figure 2, Item 3).
2. Install wing nut (Figure 2, Item 7), nut (Figure 2, Item 6), lock washer (Figure 2, Item 5), and finishing washer (Figure 2, Item 4) to ground bolt (Figure 2, Item 1).

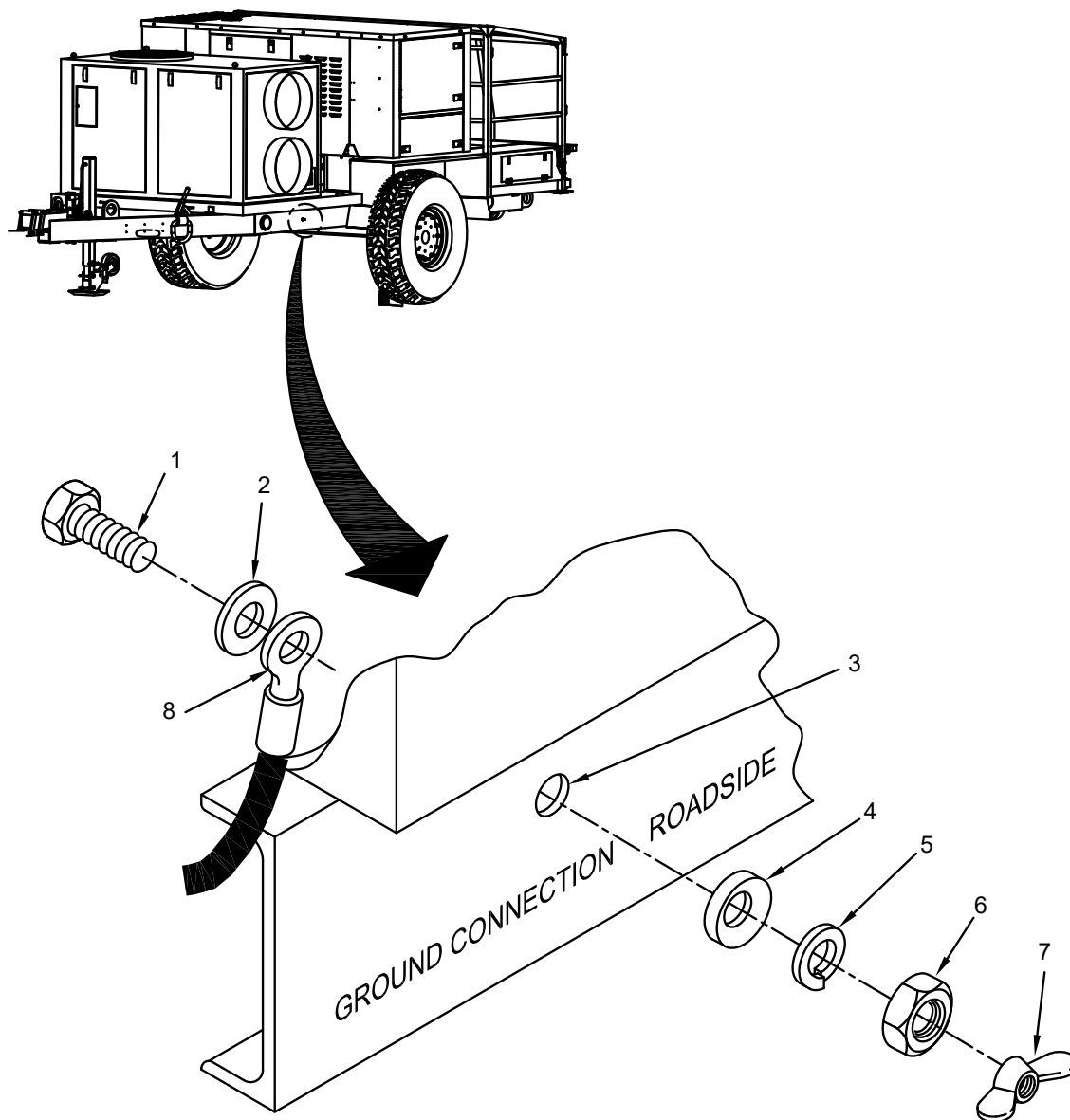


Figure 2. Ground Stud Removal/Replacement.

END OF TASK

LANYARD ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Lanyard assembly

References

WP 0005

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

REMOVAL

1. Unload any ancillary devices from trailer that will interfere with replacement of lanyard assembly.
2. Drill out center of lanyard rivet (Figure 3, Item 1) using a 3/16" drill bit.
3. Remove and discard rivet (Figure 3, Item 1). Remove lanyard assembly (Figure 3, Item 2).

END OF TASK**REPLACEMENT**

1. Using rivet gun, place rivet through lanyard assembly (Figure 3, Item 2) hole and hole in trailer structure.
2. Lock down rivet (Figure 3, Item 1).
3. Reload ancillary devices in trailer.

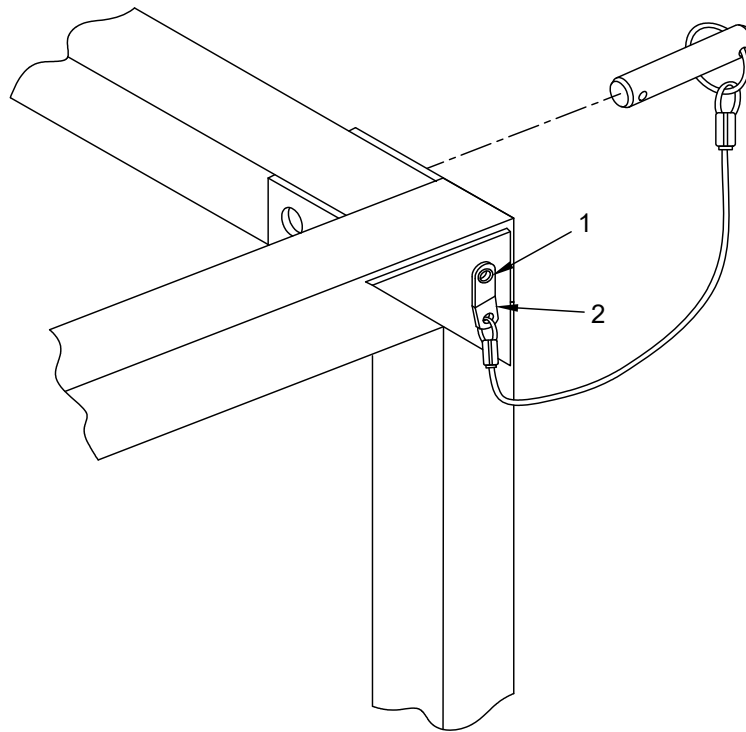


Figure 3. Lanyard Assembly Removal/Replacement.

END OF TASK

FIRE EXTINGUISHER BRACKET REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Fire extinguisher bracket

References

WP 0005

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked
Genset shutdown

CAUTION

Be aware of wiring harness behind bracket when drilling or damage may result.

REMOVAL

1. Unload any ancillary devices from trailer that will interfere with replacement of fire extinguisher bracket.
2. Remove fire extinguisher (Figure 4, Item 6) from bracket (Figure 4, Item 3).
3. Drill out four rivets (Figure 4, Item 5) from fire extinguisher bracket (Figure 4, Item 3) using a drill with 3/16" bit.
5. Remove and discard fire extinguisher bracket (Figure 4, Item 3).

END OF TASK**REPLACEMENT**

1. Position fire extinguisher bracket (Figure 4, Item 3) over Genset enclosure mounting holes (Figure 4, Item 4) and insert four rivets (Figure 4, Item 2).

NOTE

To ensure proper alignment, insert all four rivets through bracket and into Genset enclosure holes before locking down rivets.

2. Lock down four rivets (Figure 4, Item 2).
3. Ensure adhesive cushions (Figure 4, Item 1) are placed at contact points between bracket (Figure 4, Item 3) and fire extinguisher (Figure 4, Item 6).
4. Secure fire extinguisher (Figure 4, Item 6) in bracket (Figure 4, Item 3).
5. Reload ancillary devices in trailer.

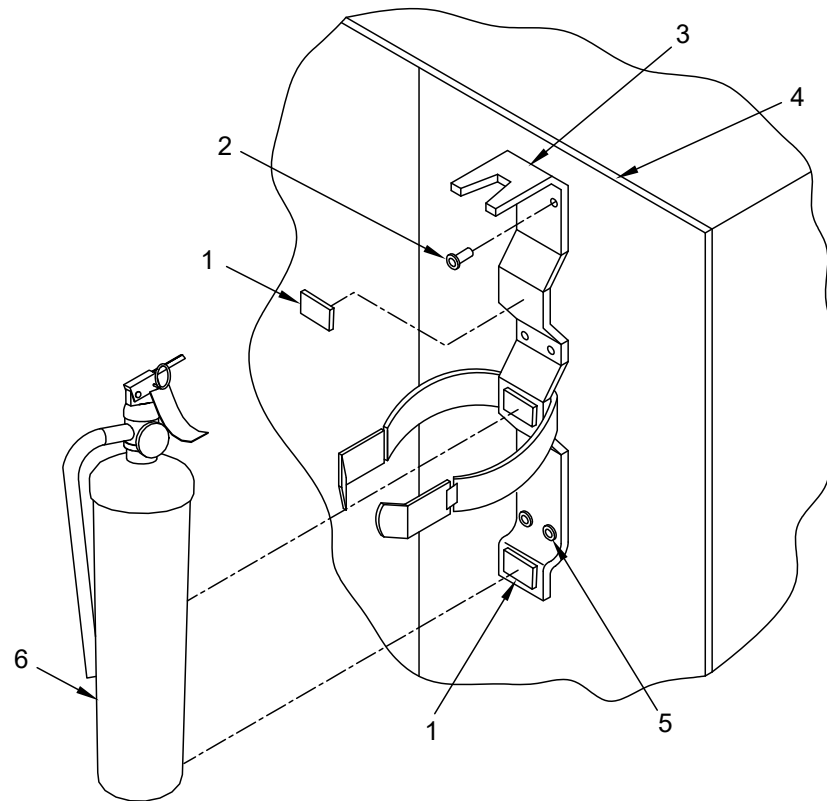


Figure 4. Fire Extinguisher Bracket Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER CARGO RESTRAINT CAGE

GENERAL

This work package provides information on the removal and replacement of the trailer cargo restraint cage

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

CARGO RESTRAINT CAGE REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (1)**Materials/Parts**

Cage

References

WP 0005

Equipment ConditionTrailer handbrakes engaged
Trailer parked & wheels chocked
Genset shutdown

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Prior to performing the following procedure ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

CAUTION

Prior to performing the following procedure ensure that the HP-2C/185 UST Trailer is out of service. No power cables or duct should be connected to the ECU or Genset. Failure to observe this caution could result in serious damage to the HP-2C/185 UST Trailer and/or its contents.

REMOVAL

1. Remove all loose items from trailer and cargo area.
2. Verify that ECU has been shut down in accordance with ECU Shut Down Procedure (WP 0005).
3. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Shut Down Procedure).
4. Verify that ducts are disconnected from ECU and all cables are disconnected from Genset and ECU.
5. Attach trailer to vehicle or stationary trailer stand.
6. Verify that both trailer wheels are chocked and hand brakes are locked.

REMOVAL – Continued**NOTE**

Genset and ECU removed for clarity. It is not necessary to remove the Genset or ECU to replace a cage section.

7. Remove retaining pins as applicable to the section of cage that will be replaced, see (Figure 1).
8. Remove cage section.

END OF TASK**REPLACEMENT**

1. Install cage section.
2. Insert retaining pins as applicable to the section of cage being replaced, see (Figure 1).
3. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.
4. Verify that ECU power cable is connected to Genset and start ECU in accordance with ECU Start Procedure (WP 0005) of this TM.

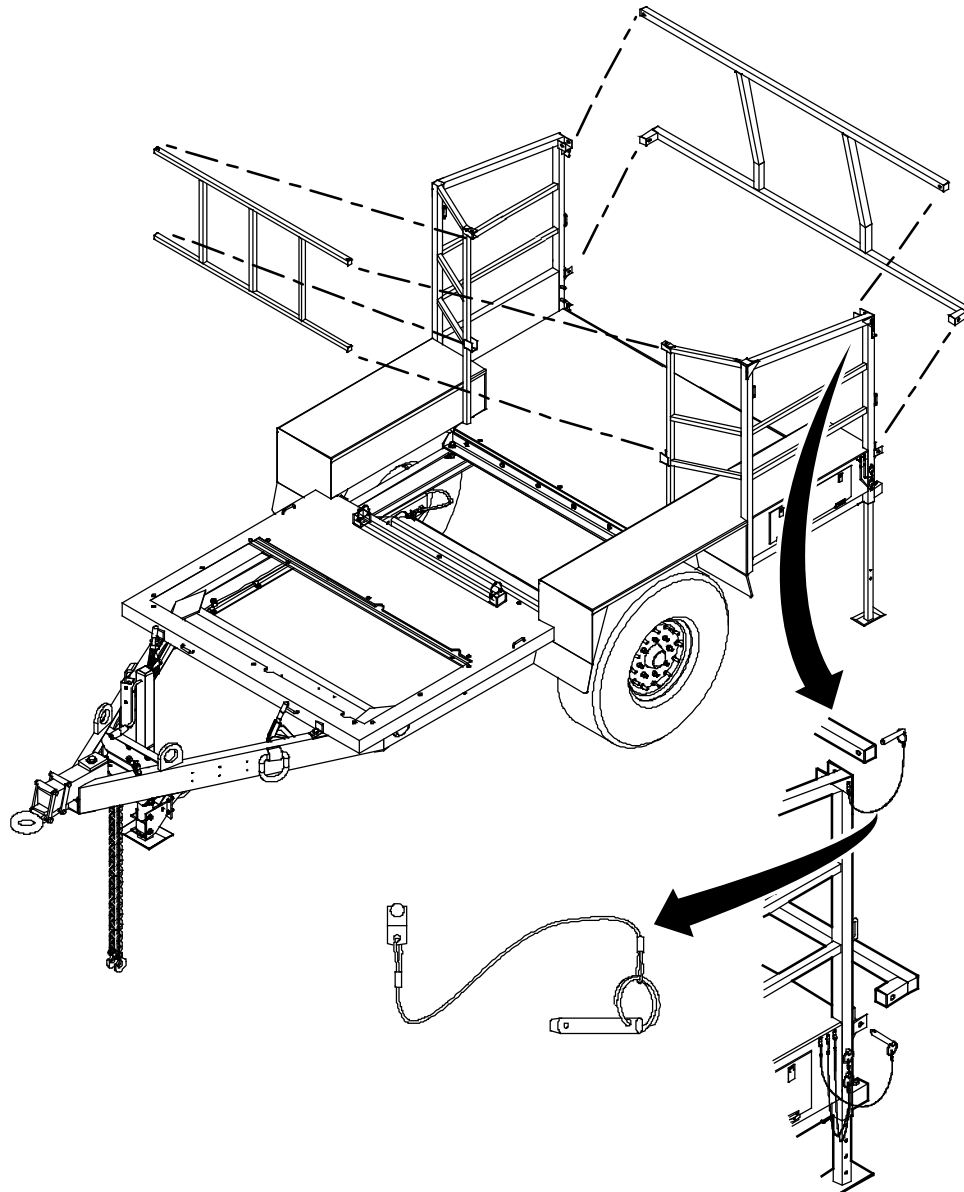


Figure 1. Cargo Restraint Cage Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER VEHICLE STOP LIGHT

GENERAL

This work package provides information on the service, removal and replacement of the vehicle stop light and inter-vehicular cable. It consists of:

- Stop light vehicle (LED) removal/replacement/test

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

VEHICLE STOP LIGHT (LED) REMOVAL/REPLACEMENT/TEST

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (1)**Materials/Parts**Vehicle stop light
Strap tie (WP 0180, Items 55 to 57)**References**

WP 0005

Equipment ConditionTrailer handbrakes engaged
Trailer parked & wheels chocked

WARNING**REMOVAL****CAUTION**

There are two different types of stop light assemblies, incandescent and LED. The incandescent stop light will only be issued until the supply runs out. If you have to replace the incandescent style vehicle stop light with a LED style stop light you **MUST** replace the assembly cable which connects these lights to the vehicle. Before beginning this procedure make sure you have all necessary parts.

NOTE

When performing the following steps, be observant of trailer and cable assembly (Figure 3, Item 2) or stop light pig tail (Figure 3, Item 4).

1. Remove two strap ties that secure the vehicle stop light connectors on cable assembly (Figure 3, Item 2) and stop light pig tail (Figure 3, Item 4).

NOTE

Prior to performing the following step, inspect all connectors. Verify that all connectors are properly tagged and identified.

2. Disconnect stop light pig-tail (Figure 3, Item 4) from the cable assembly (Figure 3, Item 2).
3. Remove and retain two bolts (Figure 3, Item 1) and flat washers (Figure 3, Item 6) and ground connection (Figure 3, Item 5) from rear of the vehicle stop light assembly (Figure 3, Item 3).
4. Remove and properly discard vehicle stop light assembly (Figure 3, Item 3).

END OF TASK

REPLACEMENT

1. Feed stop light pig-tail (Figure 3, Item 4) through trailer and insert vehicle stop light assembly (Figure 3, Item 3).

NOTE

When performing the following step, make sure that area where ground cable (Figure 3, Item 5) is free and clear of all paint, grease, dirt or other items which may prevent good electrical connection.

2. Secure vehicle stop light assembly (Figure 3, Item 3) and ground cable (Figure 3, Item 5) to trailer using two bolts (Figure 3, Item 1) and flat washers (Figure 3, Item 6).
3. Connect stop light pig-tail (Figure 3, Item 4) to cable assembly (Figure 3, Item 2).
4. Secure connection using two strap ties. Trim off excess.

END OF TASK**TEST**

1. Connect inter-vehicular cable to tow vehicle and vehicle quick disconnect.
2. Have driver turn on running lights, observe that trailer running lights activate.
3. While driver pushes down on brake pedal, observe that trailer brake lights activate.
4. While driver activates turn signals and hazard lights, observe that turn signal and hazard light on trailer activate.
5. While driver activates black-out drive lights, observe that trailer blackout lights activate.
6. If any of the above steps fail, troubleshoot system.

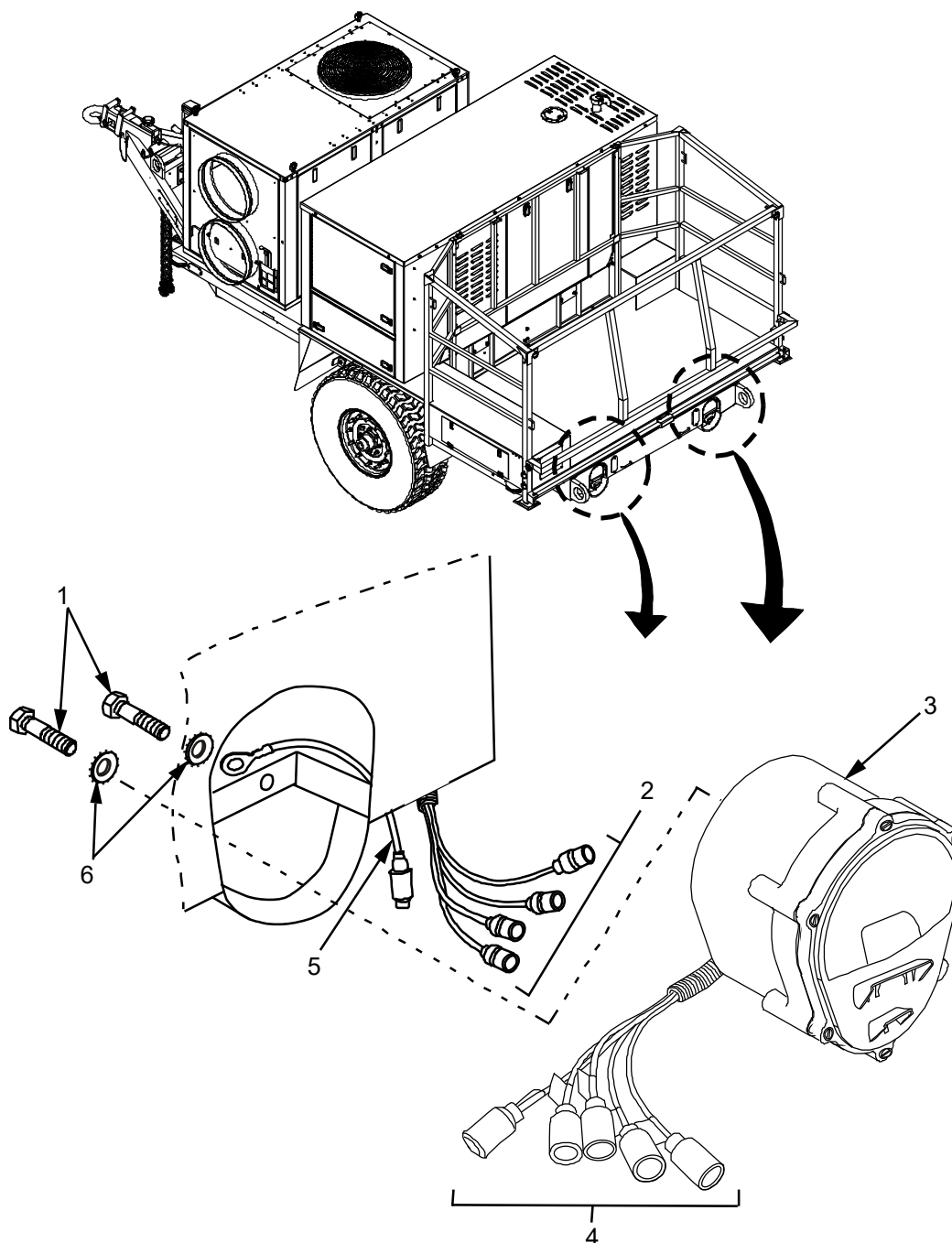


Figure 3. Vehicle Stop Light (LED) Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER INTER-VEHICULAR CABLE

GENERAL

This work package provides information on the service, removal, and replacement of the vehicle stop light and inter-vehicular cable. It consists of:

- Inter-vehicular cable removal/replacement/test

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

**VEHICLE STOP LIGHT WIRING HARNESS (INTER-VEHICULAR CABLE)
REMOVAL/REPLACEMENT/TEST**

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel RequiredWheeled Vehicle Mechanic, MOS
91B (1)**Materials/Parts**Cable assembly, special purpose, electrical
Strap tie (WP 0180, Items 55 to 57)**References**

WP 0005

Equipment ConditionTrailer handbrakes engaged
Trailer parked & wheels chocked
Genset shutdown
Battery switch set to OFF

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

NOTE

Prior to performing the following procedure, verify that inter-vehicular cable is bad. Using a multimeter, measure continuity of cable assembly. If readings are 5 ohms or less cable is good. (See Table 1 for connections.)

REMOVAL

1. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Stop Procedure).

NOTE

Prior to performing step, ensure that all electrical connections on both the cable assembly being installed and the mating connections on the vehicle stop lights are properly identified. If cable markings are missing or illegible properly mark connections.

REMOVAL – Continued

2. Remove ten self-locking nuts (Figure 1, Item 5) that secure cable clamps (Figure 1, Item 3)/ inter-vehicular cable (Figure 1, Item 6) to mounting studs (Figure 1, Item 2) on trailer frame (Figure 1, Item 1). Retain self-locking nuts (Figure 1, Item 5).
3. Disconnect ground wire (Figure 1, Item 4) from mounting stud (Figure 1, Item 2).
4. Remove ten cable clamps (Figure 1, Item 3) that secure inter-vehicular cable (Figure 1, Item 6) to trailer frame (Figure 1, Item 1).

NOTE

When performing the following steps, be observant of vehicle stop light assembly. Do not cut or damage associated pig-tail.

5. Cut strap ties from vehicle stop light assembly wiring connectors.
6. Disconnect inter-vehicular cable (Figure 1, Item 6) from pigtail of vehicle stop light assemblies.
7. Cut strap tie securing excess cable.
8. Pull inter-vehicular cable (Figure 1, Item 6) through feed through hole in frame and through opening in front of trailer frame. Discard inter-vehicular cable (Figure 1, Item 6).

END OF TASK**REPLACEMENT****NOTE**

When performing the following steps, be observant of trailer and cable assembly. Do not cut or damage inter-vehicular cable (Figure 1, Item 6).

Leave approximately 5 ½ feet of inter-vehicular cable (Figure 1, Item 6) to allow electrical connection to towing vehicle.

1. Feed inter-vehicular cable (Figure 1, Item 6) through opening in front of trailer frame (Figure 1, Item 1).
2. Route cable assembly (Figure 1, Item 6) along curbside of trailer frame (Figure 1, Item 1). Be observant of ten mounting studs (Figure 1, Item 2).
3. Feed inter-vehicular cable (Figure 1, Item 6) through opening in center of trailer frame

NOTE

When performing the following step, do not attach cable clamps (Figure 1, Item 3) to rear of trailer frame (Figure 1, Item 1).

4. Starting at front of trailer frame (Figure 1, Item 1), install seven of the ten cable clamps (Figure 1, Item 3). Secure cable clamps (Figure 1, Item 3) to mounting studs (Figure 1, Item 2) with self-locking nuts (Figure 1, Item 5).

REPLACEMENT – Continued**NOTE**

When performing the following step, do not force connections damage to cable/ vehicle stop light assembly could occur. If connectors will not mate, inspect both connections for bent pins, keys that do not mate, or other damage.

5. Make electrical connections between inter-vehicular cable (Figure 1, Item 6) and pig-tails on vehicle stop lights (see Table 1).
6. Install cable clamp (Figure 1, Item 3) and ground terminal (Figure 1, Item 4) and secure with self-locking nut (Figure 1, Item 5) to stud (Figure 1, Item 2) on curbside rear of trailer frame (Figure 1, Item 1).

NOTE

When performing the following steps, be observant of trailer and cable assembly. Do not cut or damage cable assembly.

7. Using two strap ties, secure stop light pig tails/ inter-vehicular cable connection to back side of trailer vehicle stop light assembly mounting bracket. Trim excess length from zip ties.
8. Install cable clamp (Figure 1, Item 3) located at rear center of trailer. Secure to stud (Figure 1, Item 2) using self-locking nut (Figure 1, Item 5).
9. Draw excess inter-vehicular cable through cable clamp (Figure 1, Item 5) towards roadside rear of trailer (Figure 1, Item 1). Install cable clamp (Figure 1, Item 3) and secure to stud with self-locking nut (Figure 1, Item 5).
10. Coil up any excess inter-vehicular cable and secure with strap tie above roadside vehicle stop light assembly.
11. Install final cable clamp (Figure 1, Item 3) and secure with self-locking nut (Figure 1, Item 5) to stud (Figure 1, Item 2) on roadside rear of trailer frame (Figure 1, Item 1).

END OF TASK**TEST**

1. Connect inter-vehicular cable to tow vehicle and vehicle quick disconnect.
2. Have driver turn on running lights, observe that trailer running lights activate.
3. While driver pushes down on brake pedal, observe that trailer brake lights activate.
4. While driver activates turn signals and hazard lights, observe that turn signal and hazard light on trailer activate.
5. While driver activates black-out drive lights, observe that trailer blackout lights activate.
6. If any of the above steps fail troubleshoot system.

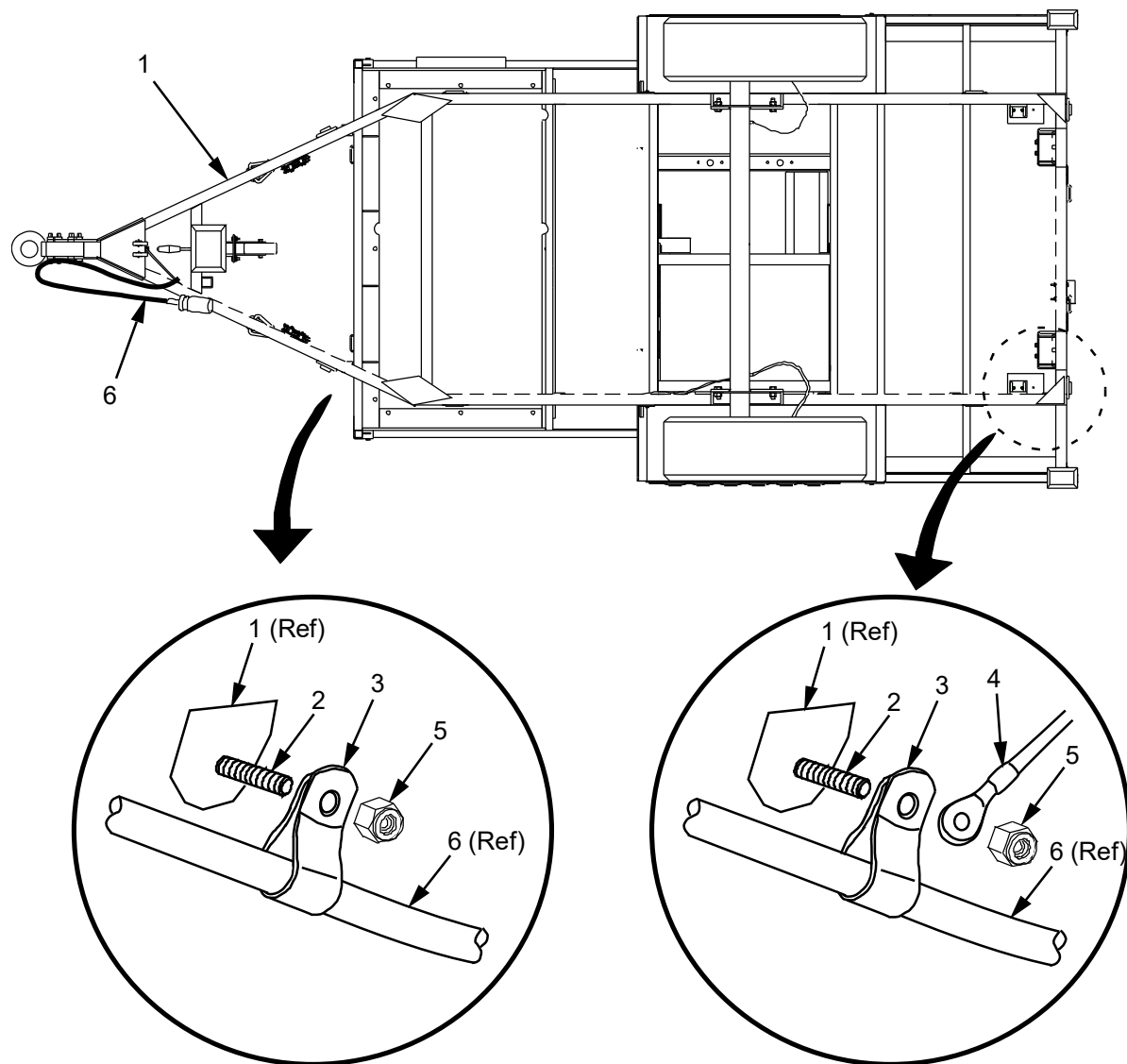
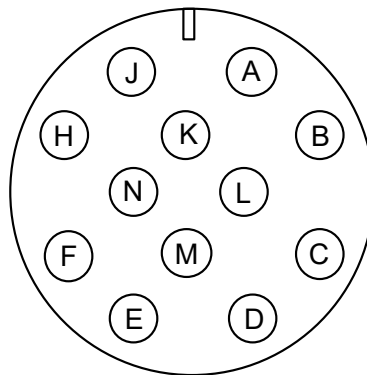


Figure 1. Inter-Vehicular Cable Removal/Replacement.

Table 1. Cable Assembly/Stop Light (LED) Connections.

FROM (Vehicle connector)	CIRCUIT NUMBER	TO Tail-light connections
A	24-484	LH Black-out
B	24-461	LH Signal
C	24-483	RH Black-out
D	90	Ground
E	21-489	Stop lights
F	23	Black-out Stop
H	490	N/C
J	22-460	RH signal
K	37	N/C
L	90	Ground
M	53	N/C
N	53	N/C



Vehicle Connection

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER BRAKES (WHEEL ASSEMBLY)

GENERAL

This work package provides information on the removal and replacement of the following components:

- Brake hub/drum removal, clean and inspect, and replacement
- Wheel cylinder removal, clean and inspect, and replacement
- Brake shoe removal, clean and inspect, and replacement
- Backing plate removal and replacement
- Brake adjustment

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brake shoe linings. Wipe excess lubricant from the brake shoe linings to prevent grease soaking into the materials. Brake shoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brake shoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

Never replace only one brake shoe. Combinations of old and new brake shoes will cause uneven braking. Accidents causing serious injury or death to personnel or damage to equipment may result.

BRAKE HUB/DRUM REMOVAL/CLEAN AND INSPECT/REPLACEMENT

INITIAL SETUP:**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Brake hub/drum
Dry cleaning solvent (WP 0180, Item 11)
Wheel bearing grease (WP 0180, Item 25)
Cotter pin

References

WP 0005

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked
Genset shutdown
Battery switch set to OFF
ECU shutdown

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brake shoe linings. Wipe excess lubricant from the brake shoe linings to prevent grease soaking into the materials. Brake shoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brake shoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

REMOVAL

1. Remove tire and wheel assembly as per (WP 0134) of this TM.
2. Using a pry bar and hammer remove the axle grease cap (Figure 1, Item 1).
3. Remove O-ring (Figure 1, Item 12) and cotter pin (Figure 1, Item 3) and discard cotter pin.
4. Remove spindle nut (Figure 1, Item 2) and washer (Figure 1, Item 4).
5. Remove hub/drum (Figure 1, Item 7) with bearings and grease seal installed.
6. Remove grease seal (Figure 1, Item 10) from hub/drum (Figure 1, Item 7).
7. Remove inner bearing (Figure 1, Item 9) and outer bearing (Figure 1, Item 5) from hub/drum (Figure 1, Item 7).

REMOVAL – Continued

8. Remove outer bearing race (Figure 1, Item 6) from hub/drum (Figure 1, Item 7).
9. Remove inner bearing race (Figure 1, Item 8) from hub/drum (Figure 1, Item 7).

CLEAN AND INSPECT**WARNING**

Dry cleaning solvent MIL-PRF-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and DO NOT breath vapors. DO NOT use near open flame or excessive heat.

1. Clean all removed components with dry cleaning solvent and allow to dry.
2. Inspect components for wear, cracks, corrosion, or other damage. Replace if damaged.
3. Inspect race and bearing, replace both as a pair if necessary.
4. Remove any corrosion with a wire brush.

WARNING

Removing metal parts could be dangerous to personnel. Always wear eye protection when replacing wheel studs. Failure to follow this warning may result in injury to personnel.

NOTE

Perform steps 5 and 6 only if any studs are damaged.

5. Drive stud (Figure 1, Item 11) out of hub/drum (Figure 1, Item 7). Discard stud.
6. Align splines on stud (Figure 1, Item 11) with splines in hub/drum (Figure 1, Item 7) and press stud (Figure 1, Item 11) into hub/drum (Figure 1, Item 7) until stud shoulder seats against hub/drum.

REPLACEMENT

1. Install outer bearing race (Figure 1, Item 6) and apply a thin film of grease to surface of outer bearing race.
2. Install inner bearing race (Figure 1, Item 8) and apply a thin film of grease to surface of inner bearing race.
3. Pack both bearings (Figure 1, Items 5 and 9) with grease by pressing fresh bearing grease into bearing roller area.
4. Install inner bearing (Figure 1, Item 9) in hub/drum (Figure 1, Item 7).
5. Apply a thin film of grease to the outer edge of grease seal (Figure 1, Item 10) and install grease seal (Figure 1, Item 10) in hub/drum (Figure 1, Item 7). Wipe excessive grease from outer surface of seal.
6. Install hub/drum (Figure 1, Item 7), with inner bearing and seal, on axle.

REPLACEMENT – Continued

7. Install outer bearing (Figure 1, Item 5), washer (Figure 1, Item 4), and spindle nut (Figure 1, Item 2).
8. Ensure spindle nut (Figure 1, Item 2) turns freely on the spindle and the brakes are not dragging.
9. While turning the hub/drum (Figure 1, Item 7) slowly, tighten the spindle nut (Figure 1, Item 2) to seat bearings.
10. Back off the spindle nut (Figure 1, Item 2) as required to align the cotter pin hole. Hub/drum must turn freely.

WARNING

Do not over tighten spindle nut or bearing damage will result.

The cotter pin (Figure 1, Item 3) prevents the spindle nut (Figure 1, Item 2) from coming loose. Failure to install the cotter pin properly will cause the spindle nut to back off of the spindle causing loss of wheel assembly.

11. Install a cotter pin (Figure 1, Item 3) and bend ends to secure the spindle nut (Figure 1, Item 2).
12. If applicable, press O-ring (Figure 1, Item 12) over spindle nut (Figure 1, Item 2).
13. Apply grease to surface of grease cap (Figure 1, Item 1).
14. Install grease cap (Figure 1, Item 1) on hub/drum (Figure 1, Item 7).
15. Install tire and wheel assembly as per (WP 0134) of this TM.

REPLACEMENT – Continued

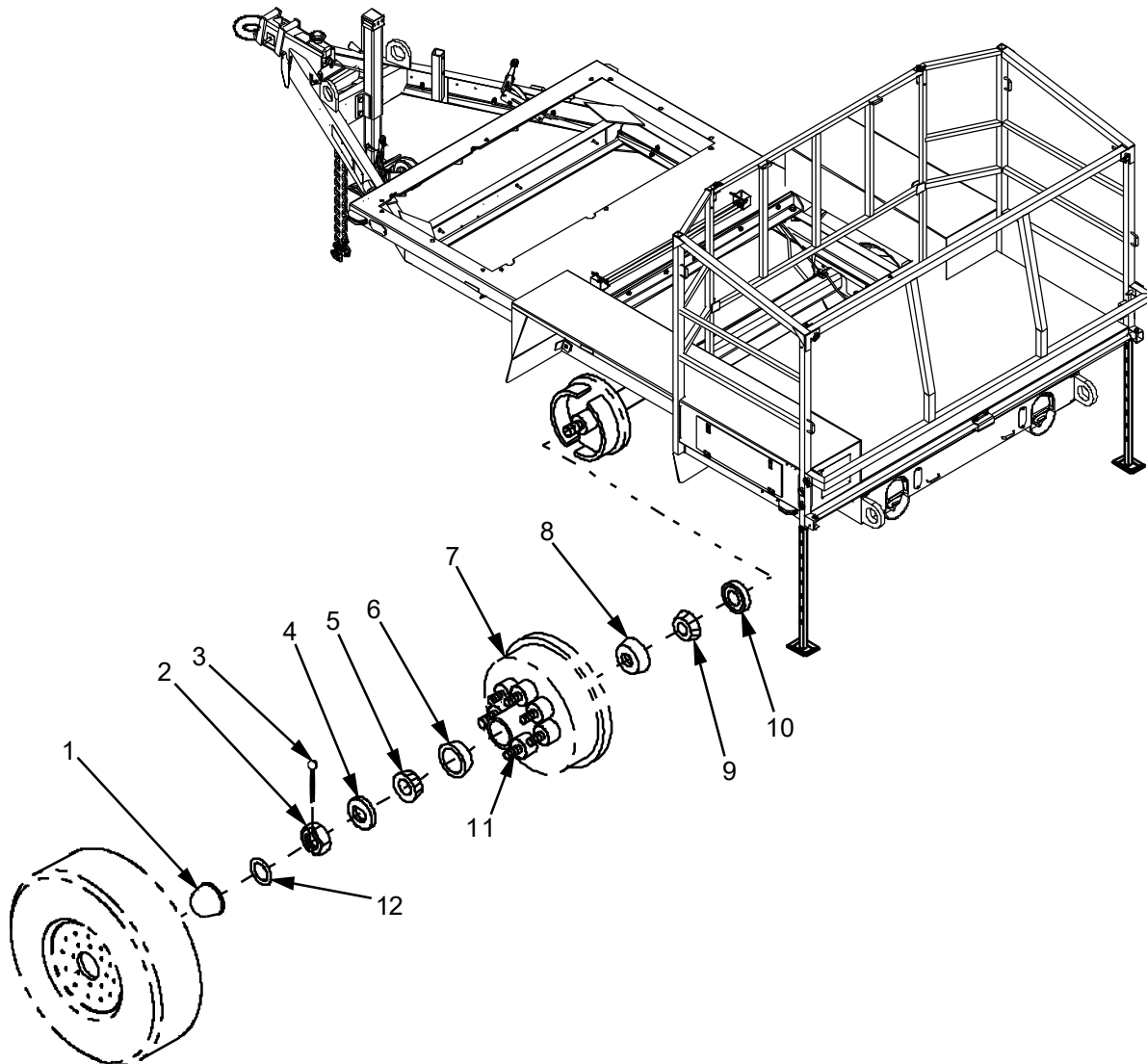


Figure 1. Brake Hub/Drum Removal/Replacement.

END OF TASK

WHEEL CYLINDER REMOVAL/CLEAN AND INSPECT/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Wheel cylinder
Dry cleaning solvent (WP 0180, Item 11)
Cloth, cleaning (WP 0180, Item 14)

References

WP 0005, WP 0134

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked
Genset shutdown
Battery switch set to OFF
ECU shutdown

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brake shoe linings. Wipe excess lubricant from the brake shoe linings to prevent grease soaking into the materials. Brake shoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brake shoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

REMOVAL

1. Remove tire and wheel assembly as per (WP 0134) of this TM.
2. Remove hub/drum assembly as per this WP.
3. Remove front shoe spring (Figure 2, Item 15) from front brake shoe (Figure 2, Item 13) and backing plate anchor pin (Figure 2, Item 5).
4. Remove rear shoe spring (Figure 2, Item 16) from rear brake shoe (Figure 2, Item 24) and backing plate anchor pin (Figure 2, Item 5).
5. Remove two cap screws (Figure 2, Item 1) with integral lock washers securing wheel cylinder (Figure 2, Item 6) to backing plate (Figure 2, Item 4).

REMOVAL – Continued

6. Pull wheel cylinder (Figure 2, Item 6) loose from backing plate (Figure 2, Item 4) while compressing push rod (Figure 2, Item 7); remove push rod (Figure 2, Item 7) from brake shoe (Figure 2, Item 13).
7. Disconnect flexible brake line (Figure 2, Item 3) from cross over brake line, retain clip (WP 0132, Figure 2, Item 11).
8. Install two temporary plugs in flexible brake line (Figure 2, Item 3) and cross over brake line.
9. Remove flexible brake line (Figure 2, Item 3) from wheel cylinder (Figure 2, Item 6). Set flexible brake line (Figure 2, Item 3) aside. Discard wheel cylinder.

CLEAN AND INSPECT**WARNING**

Dry cleaning solvent MIL-PRF-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and DO NOT breath vapors. DO NOT use near open flame or excessive heat.

1. Clean all removed components except wheel cylinder (Figure 2, Item 6) with dry cleaning solvent and allow to dry.
2. Inspect components for cracks, brakes, corrosion, or damaged threads. Replace if damaged.

REPLACEMENT

1. Attach flexible brake line (Figure 2, Item 3) to wheel cylinder (Figure 2, Item 6) and tighten.
2. Remove two temporary plugs from flexible brake line (Figure 2, Item 3) and cross over brake line.
3. Connect flexible brake line (Figure 2, Item 3) to cross over brake line and install clip (WP 0132, Figure 2, Item 11).
4. Install push rod (Figure 2, Item 7) in brake shoe (Figure 2, Item 13) and wheel cylinder (Figure 2, Item 6) and mount onto backing plate (Figure 2, Item 4). Retighten all lines.

NOTE

For ease of installation, install the rear caps crews first.

5. Install two cap screws (Figure 2, Item 1) with integral lock washers and tighten finger tight. Torque cap screws (Figure 2, Item 1) to 168 ± 17 in-lb (19 ± 1.9 N·m).
6. Install rear shoe spring (Figure 2, Item 16) to rear brake shoe (Figure 2, Item 24) and backing plate anchor pin (Figure 2, Item 5).
7. Install front shoe spring (Figure 2, Item 15) to front brake shoe (Figure 2, Item 13) and backing plate anchor pin (Figure 2, Item 5).
8. Install hub/drum assembly as per this WP.

REMOVAL – Continued

9. Bleed brakes as per (WP 0132) of this TM.

10. Install tire and wheel assembly as per (WP 0134) of this TM.

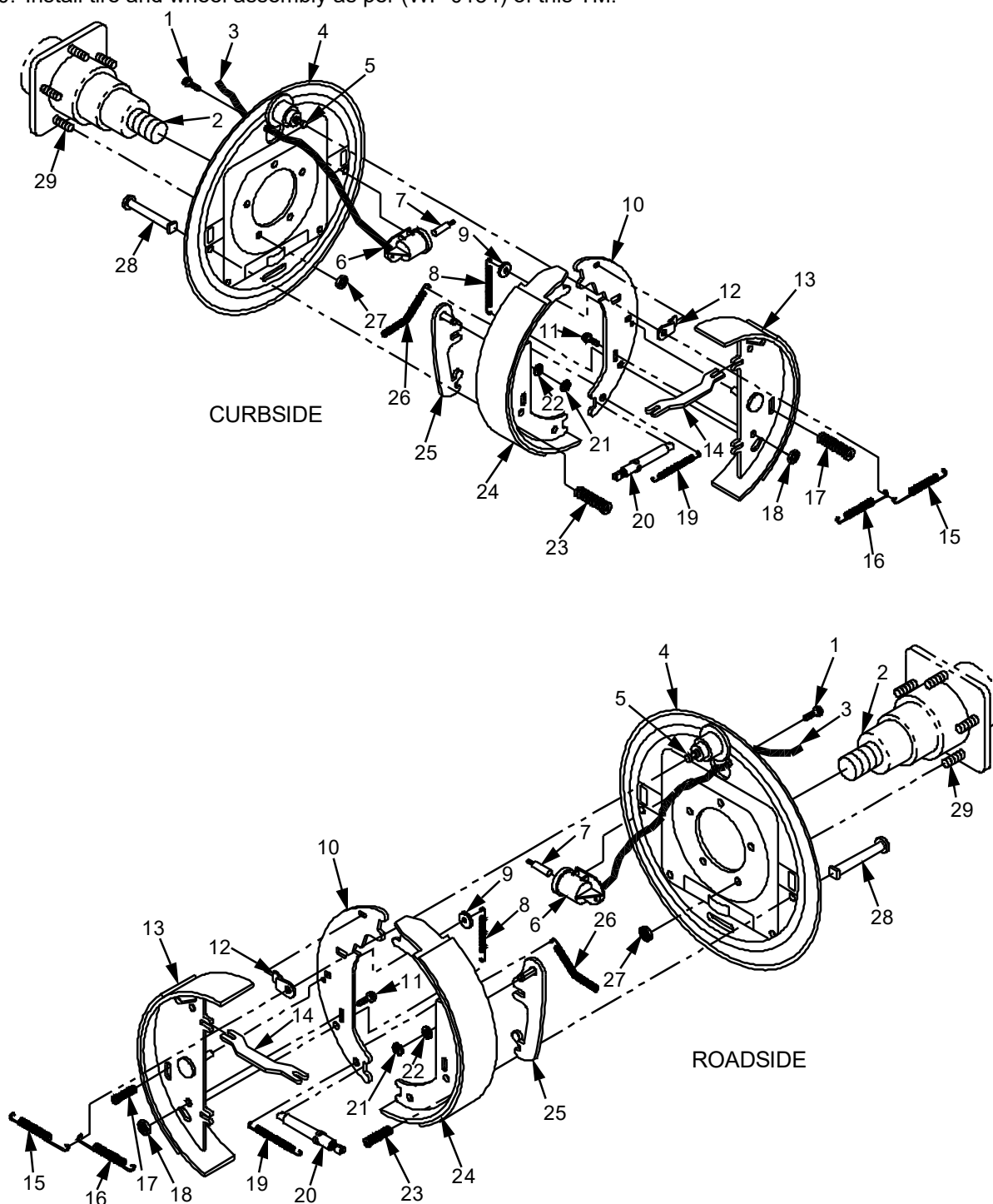


Figure 2. Wheel Cylinder, Brake shoe, and Backing Plate Removal/Clean and Inspect/Replacement.

END OF TASK

BRAKE SHOE REMOVAL/CLEAN AND INSPECT/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (2)

Materials/Parts

Brake shoes
Dry cleaning solvent (WP 0180, Item 11)
Cloth, cleaning (WP 0180, Item 14)

References

WP 0005, WP 0134

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked
Genset shutdown
Battery switch set to OFF
ECU shutdown

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brake shoe linings. Wipe excess lubricant from the brake shoe linings to prevent grease soaking into the materials. Brake shoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brake shoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

Never replace only one brake shoe. Combinations of old and new brake shoes will cause uneven braking. Accidents causing serious injury or death to personnel or damage to equipment may result.

REMOVAL

1. Remove tire and wheel assembly as per (WP 0134) of this TM.
2. Remove hub/drum assembly as per this WP.
3. Remove front shoe spring (Figure 2, Item 15) from front brake shoe (Figure 2, Item 13) and backing plate anchor pin (Figure 2, Item 5).
4. Remove rear shoe spring (Figure 2, Item 16) from rear brake shoe (Figure 2, Item 24) and backing plate anchor pin (Figure 2, Item 5).

REMOVAL – Continued

5. Remove front brake shoe hold down cup and spring (Figure 2, Item 17) from front brake shoe hold down pin securing front brake shoe (Figure 2, Item 13) to backing plate (Figure 2, Item 4).
6. Remove parking shoe lever (Figure 2, Item 14) and set parking shoe lever aside.
7. Remove travel link (Figure 2, Item 12) from anchor pin (Figure 2, Item 5) and front brake shoe (Figure 2, Item 13).
8. Rotate and lower front brake shoe (Figure 2, Item 13). Remove adjuster (Figure 2, Item 20) and adjuster spring (Figure 2, Item 19) from front brake shoe. Remove adjuster spring from rear brake shoe and set aside.
9. Remove rear brake shoe hold down cup and spring (Figure 2, Item 23) from rear brake shoe hold down pin (Figure 2, Item 28) securing rear brake shoe (Figure 2, Item 24) to backing plate (Figure 2, Item 4).
10. While holding rear brake shoe, remove parking brake cable (Figure 2, Item 26) from parking brake link (Figure 2, Item 25). If necessary, see (WP 0128, Figure 7, Items 3 and 5) of this TM.
11. Set rear brake shoe and parking brake link aside.
12. Using a flat tip screw driver, pry retainer (Figure 2, Item 21) from parking brake link (Figure 2, Item 25) on rear brake shoe assembly (Figure 2, Item 24). Remove washer (Figure 2, Item 22) and set parking brake link, retainer, and washer aside.
13. Slide parking brake link (Figure 2, Item 25) out of rear brake shoe (Figure 2, Item 24) and set parking brake link aside. Discard rear brake shoe.
14. Release top of tension spring (Figure 2, Item 8) on rear of front brake shoe (Figure 2, Item 13).
15. Remove washer (Figure 2, Item 9) from rear of front brake shoe (Figure 2, Item 13).
16. Remove bolt (Figure 2, Item 11) and lock nut (Figure 2, Item 18) holding front brake shoe (Figure 2, Item 13) and backing shoe lever (Figure 2, Item 10) together.
17. Slide backing shoe lever (Figure 2, Item 10) off of front brake shoe (Figure 2, Item 13).
18. Remove tension spring (Figure 2, Item 8) from back of backing shoe lever (Figure 2, Item 10). Set backing shoe lever and tension spring aside. Discard front brake shoe.

END OF TASK**CLEAN AND INSPECT****WARNING**

Dry cleaning solvent MIL-PRF-680 is toxic and flammable. Always wear protective goggles and gloves, and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and DO NOT breath vapors. DO NOT use near open flame or excessive heat.

1. Clean all parts with dry cleaning solvent and rag.
2. Inspect all parts for damage. Replace any damaged parts.

CLEAN AND INSPECT - Continued

3. Inspect brake shoe surface for cracks, distortion, and excessive wear. Brake shoe linings should have a minimum thickness of 1/8 inch (3.2 mm). Replace brake shoe if cracked or if lining thickness is less than 1/8 inch (3.2 mm).

END OF TASK**REPLACEMENT**

1. Slide backing shoe lever (Figure 2, Item 10) onto front brake shoe (Figure 2, Item 13).
2. Insert bolt (Figure 2, Item 11) and lock nut (Figure 2, Item 18) through front brake shoe (Figure 2, Item 13) and backing shoe lever (Figure 2, Item 10) and tighten.
3. Attach washer (Figure 2, Item 9) to stud on rear of front brake shoe (Figure 2, Item 13).
4. Attach tension spring (Figure 2, Item 8) to rear of front brake shoe (Figure 2, Item 13) and set assembly aside.
5. Slide parking brake link (Figure 2, Item 25) into rear brake shoe (Figure 2, Item 24).
6. Attach washer (Figure 2, Item 22) to parking brake link stud (Figure 2, Item 25) of rear brake shoe (Figure 2, Item 24) and slide retainer (Figure 2, Item 21) onto parking brake link stud (Figure 2, Item 25).
7. Squeeze retainer (Figure 2, Item 21) with pliers to lock into place and set rear brake shoe assembly aside.
8. Install travel link (Figure 2, Item 12) on front brake shoe (Figure 2, Item 13).
9. Hold front brake shoe assembly (Figure 2, Item 13) in position and slide travel link (Figure 2, Item 12) onto backing plate anchor pin (Figure 2, Item 5).
10. Rotate front brake shoe assembly down and insert wheel cylinder push rod (Figure 2, Item 7) into backing shoe lever (Figure 2, Item 10).
11. Install front brake shoe hold down cup and spring (Figure 2, Item 17) into front brake shoe hold down pin to secure front brake shoe (Figure 2, Item 13) to backing plate (Figure 2, Item 4). Install front shoe spring (Figure 2, Item 15) to backing plate anchor pin (Figure 2, Item 5).
12. Install parking shoe lever (Figure 2, Item 14) into front brake shoe (Figure 2, Item 13).
13. Insert adjuster spring (Figure 2, Item 19) into front brake shoe (Figure 2, Item 13).
14. While holding rear brake shoe assembly (Figure 2, Item 24), attach parking brake cable (Figure 2, Item 26) to parking brake link (Figure 2, Item 25). If necessary, see (WP 0133, Figure 7, Items 3 and 5) of this TM.
15. Insert adjuster (Figure 2, Item 20) into front brake shoe (Figure 2, Item 13).
16. Hold rear brake shoe assembly (Figure 2, Item 24) in position and insert adjuster spring (Figure 2, Item 19) into rear brake shoe hole (Figure 2, Item 24).

REPLACEMENT – Continued

17. Rotate rear brake shoe assembly (Figure 2, Item 24) around adjuster (Figure 2, Item 20) until adjuster (Figure 2, Item 20) fits into slot of rear brake shoe assembly (Figure 2, Item 24).
18. Install parking shoe lever (Figure 2, Item 14) into rear brake shoe (Figure 2, Item 24).
19. Install rear brake shoe hold down cup and spring (Figure 2, Item 23) onto rear brake shoe hold down pin (Figure 2, Item 28) to secure rear brake shoe (Figure 2, Item 24) to backing plate (Figure 2, Item 4).
20. Install rear brake shoe spring (Figure 2, Item 16) from rear brake shoe (Figure 2, Item 24) into backing plate anchor pin (Figure 2, Item 5).
21. Install hub/drum assembly as per this WP.
22. Install tire and wheel assembly as per (WP 0134) of this TM.
23. Perform brake adjustment as per this WP.

END OF TASK

BACKING PLATE REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (2)

Materials/Parts

Backing plate
Dry cleaning solvent (WP 0180, Item 11)
Cloth, cleaning (WP 0180, Item 14)

References

WP 0005, WP 0134

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked
Genset shutdown
Battery switch set to OFF
ECU shutdown

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

DO NOT allow grease to contact brake shoe linings. Wipe excess lubricant from the brake shoe linings to prevent grease soaking into the materials. Brake shoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

DO NOT handle brake shoes, drum/hubs, or other brake components unless area has been properly cleaned. There may be asbestos dust on these components which can be dangerous if touched or inhaled. Wear an approved filter mask and gloves.

NEVER use compressed air or a dry brush to clean brake components. Injury may result.

REMOVAL

1. Remove tire and wheel assembly as per (WP 0134) of this TM.
2. Remove hub/drum assembly as per this WP.
3. Remove brake shoes as per this WP.
4. Remove wheel cylinder as per this WP.
5. Remove parking brake cable from backing plate (Figure 2, Item 4). If necessary, see this Work Package.
6. Remove 5 nuts (Figure 2, Item 27) from mounting studs (Figure 2, Item 29) securing backing plate (Figure 2, Item 4) to axle spindle (Figure 2, Item 2). Remove backing plate (Figure 2, Item 4).

REPLACEMENT**WARNING**

DO NOT allow grease to contact brake shoe linings. Wipe excess lubricant from the brake shoe linings to prevent grease soaking into the materials. Brake shoe linings can absorb grease and oil, causing early glazing of linings and very poor breaking action. Failure to follow this warning may cause brakes to malfunction, resulting in injury or death to personnel or damage to equipment.

1. Install backing plate (Figure 2, Item 4) on axle spindle (Figure 2, Item 2). Install 5 nuts (Figure 2, Item 27) onto mounting studs (Figure 2, Item 29). Tighten nuts and torque to 50 ± 5 ft-lb (69 ± 7 Nm).
2. Install parking brake cable to backing plate (Figure 2, Item 4). If necessary, see (WP 0128, Figure 7, Items 3 and 5) of this TM.
3. Install wheel cylinder as per this WP.
4. Install brake shoes as per this WP.
5. Install hub/drum assembly as per this WP.
6. Install tire and wheel assembly as per (WP 0134) of this TM.
7. Perform brake adjustment as per this WP.

END OF TASK

BRAKE ADJUSTMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (2)

Materials/Parts

Backing plate
Dry cleaning solvent (WP 0180, Item 11)
Cloth, cleaning (WP 0180, Item 14)

References

WP 0005, WP 0134

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked
Genset shutdown
Battery switch set to OFF
ECU shutdown

ADJUSTMENT**NOTE**

Service brake adjustment should be performed on all wheels to compensate for normal brake shoe lining wear.

1. Remove wheel choke on side being adjusted. Ensure opposite wheel is chocked.
2. Place 3 ton hydraulic jack under trailer frame near wheel assembly to be adjusted.

NOTE

Prior to raising trailer make sure that stabilizer leg on opposite side of trailer is not down.

3. Using three-ton jack, raise trailer to sufficient height where fully inflated wheel assembly (Figure 3, Item 2) may be rotated freely.
4. Place three-ton jack stand (Figure 3, Item 1) under trailer axle between wheel assembly and axle mount. Raise jack stand (Figure 3, Item 1) to meet trailer axle. Lower trailer onto jack stand.

WARNING

When the following step is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

5. Release hand brake on side being adjusted.
6. Remove protective plug (Figure 3, Item 4) from backing plate.
7. Rotate star wheel (Figure 3, Item 3) upward, 20 to 25 clicks, to tighten brakes.

ADJUSTMENT – Continued**NOTE**

The brake adjustment is performed by rotating the wheel using a torque wrench (Figure 3, Item 5) and measuring the force required to turn the wheel. While checking the adjustment, the wheel must be turned in the forward direction to ensure correct adjustment. Rotate wheel in the forward direction from taillight toward the tongue.

The torque wrench must be properly aligned on the wheel to ensure accurate measurement of force. Proper placement for the torque wrench is with the handle pointing away from the center of the wheel and in a straight line with the center of the grease cap.

If the wheel rotates in the reverse or backwards direction, the brake shoes must be aligned by starting the procedure again.

8. Rotate the wheel three or four revolutions in the forward direction and stop the wheel where two opposing lug nuts are directly above and below the center of the grease cap.
9. Set torque wrench to 170 ± 17 in-lb (19 ± 1.9 N·m) and place on the top lug nut and turn the wheel 90 degrees, 1/4 rotation, in the forward direction checking whether the torque wrench exceeded the setting.
10. Move the torque wrench back to the top, checking every other lug nut and repeating step 9. Continue until four lug nuts have been checked, one full rotation of the wheel.
11. Reset the torque wrench to 220 ± 22 in-lb (24 ± 2.4 N·m) and repeat steps 9 and 10. If the torque measurements at two or more lugs are less than 170 in-lbs, tighten the brakes and repeat steps 9 through 11. If the torque measurement at two or more lugs is greater than 220 in-lbs, loosen the brakes and repeat steps 9 through 11.
12. Loosen brakes by rotating star wheel in the opposite direction 25 clicks.
13. Install protective plug (Figure 3, Item 4) in backing plate.
14. Using three-ton jack, raise trailer to sufficient height to remove jack stand (Figure 3, Item 1).
15. Remove three-ton jack.
16. Repeat steps 5 through 15 for other side.

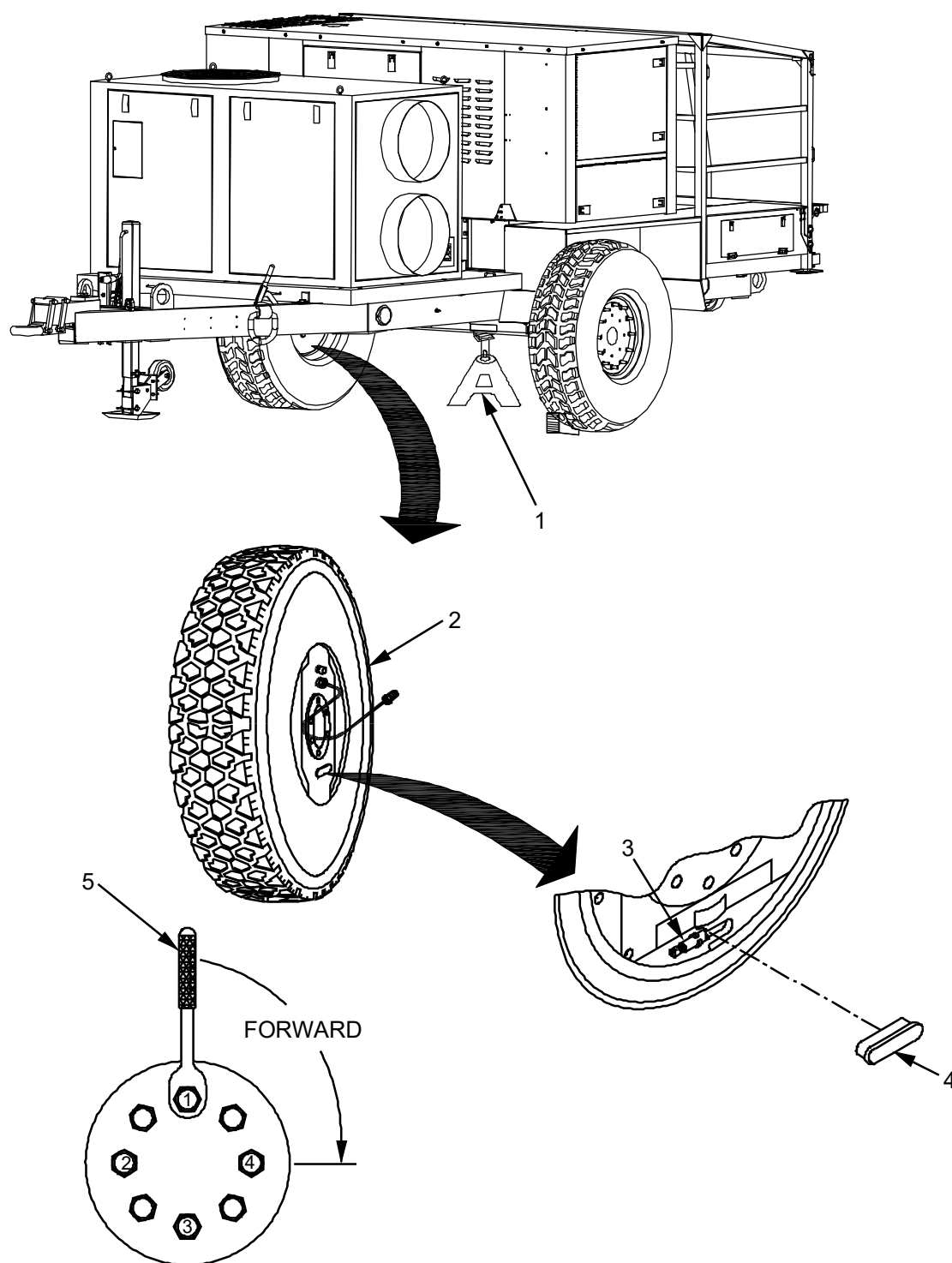


Figure 3. Brake Adjustment.

END OF TASK**END OF WORK PACKAGE**

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER BRAKES

GENERAL

This work package provides information on the removal and replacement of the following components:

- Master cylinder removal and replacement
- Brake lines removal and replacement
- Bleed brake system

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

If ECU has been in operation, components may be extremely cold or extremely hot. To prevent serious injury to personnel, allow sufficient time for components to warm up/cool down before performing procedures.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

MASTER CYLINDER REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Master cylinder
Drain pans

References

WP 0005

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

NOTE

When disconnecting brake line, brake fluid will drain out. Use drain pan to catch old brake fluid and discard properly.

REMOVAL

1. Remove the main hydraulic brake line (Figure 1, Item 6) from master cylinder (Figure 1, Item 4).
2. Remove 2 mounting bolts (Figure 1, Item 8) and lock nuts (Figure 1, Item 3) from trailer frame (Figure 1, Item 2) and master cylinder (Figure 1, Item 4).
3. Retain 4 spacers (Figure 1, Item 5) from between master cylinder (Figure 1, Item 4) and trailer frame (Figure 1, Item 2).
4. Slide master cylinder (Figure 1, Item 4) back toward trailer bed, being careful not to damage actuator shaft (Figure 1, Item 1).

END OF TASK**REPLACEMENT**

1. Lift actuator shaft (Figure 1, Item 1) while sliding master cylinder (Figure 1, Item 4) into trailer frame (Figure 1, Item 2).
2. Slide actuator shaft (Figure 1, Item 1) into slot in master cylinder plunger (Figure 1, Item 7).
3. Position spacers (Figure 1, Item 5) in between master cylinder (Figure 1, Item 4) and trailer frame (Figure 1, Item 2).
4. Insert mounting bolts (Figure 1, Item 8) and lock nuts (Figure 1, Item 3) into trailer frame (Figure 1, Item 2), master cylinder (Figure 1, Item 4), and spacers (Figure 1, Item 5) and tighten.
5. Attach main hydraulic brake line (Figure 1, Item 6) to master cylinder (Figure 1, Item 4) and tighten.
6. Bleed brakes per this WP.

REPLACEMENT – Continued

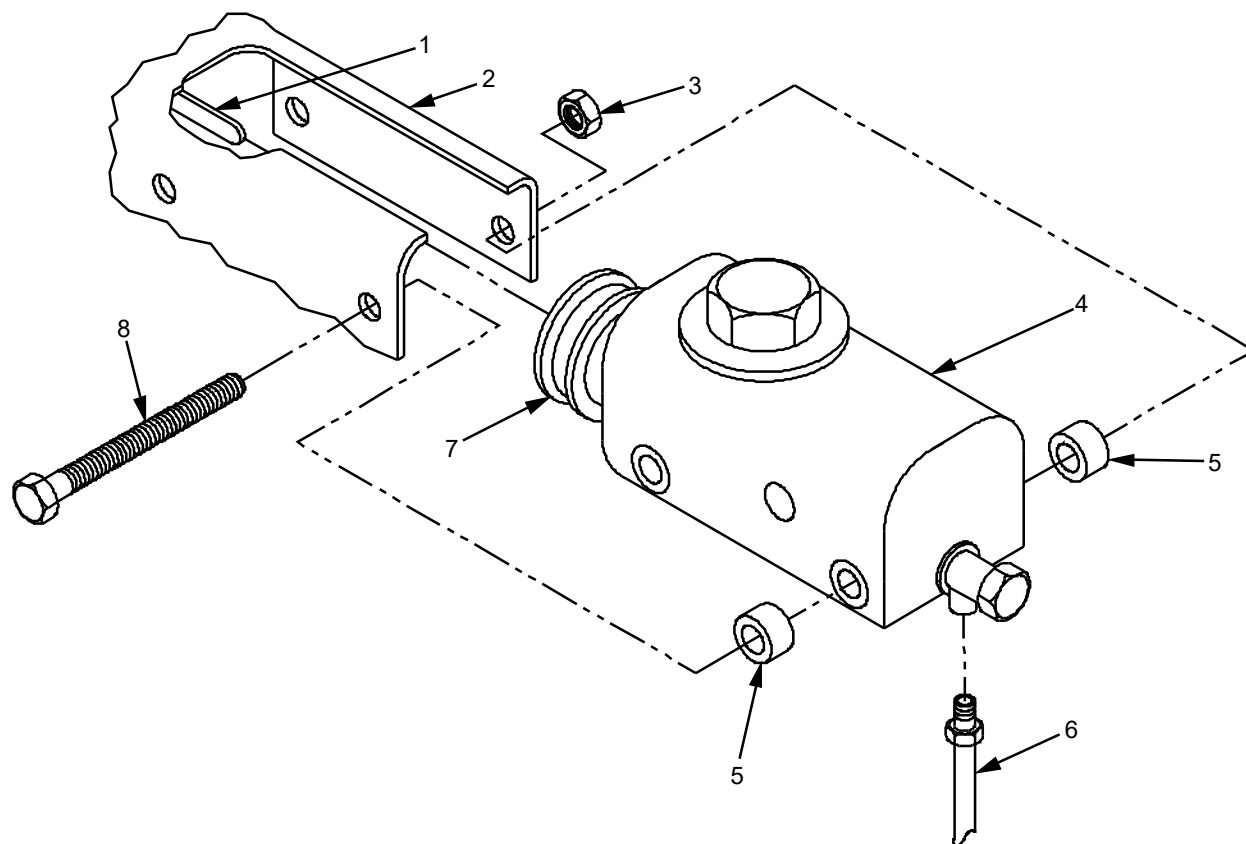


Figure 1. Master Cylinder Removal/Replacement.

END OF TASK

BRAKE LINE REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Brake line
Drain pans
Strap ties (WP 0180, Items 55 to 57)

References

WP 0005

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

REMOVAL (MAIN HYDRAULIC LINE)

1. Ensure hand brakes are locked.
2. Ensure brake lockout is not engaged.

NOTE

When disconnecting brake line, brake fluid will drain out. Use drain pan to catch old brake fluid and discard properly.

3. Place drain pans under the hydraulic brake line distribution block (Figure 2, Item 9) and the master cylinder (Figure 2, Item 13).
4. Remove five lock nuts (Figure 2, Item 1) from the main hydraulic brake line mounting studs (Figure 2, Item 3).
5. Remove five mounting clamps (Figure 2, Item 2) from mounting studs (Figure 2, Item 3).
6. Disconnect the main brake line (Figure 2, Item 12) from the hydraulic brake line distribution block (Figure 2, Item 9).
7. Drain brake fluid into drain pan.
8. Disconnect the main hydraulic brake line (Figure 2, Item 12) on master cylinder (Figure 2, Item 13).
9. Remove and retain mounting clamps (Figure 2, Item 2) from brake line and discard brake line.

END OF TASK

REPLACEMENT (MAIN HYDRAULIC LINE)

1. Place the main hydraulic brake line (Figure 2, Item 12) into position through the trailer frame.
2. Place the five mounting clamps (Figure 2, Item 2) onto the main hydraulic brake line (Figure 2, Item 12) in the vicinity of the five mounting studs (Figure 2, Item 3) and place the opening of the clamps onto the studs.
3. Attach the main hydraulic brake line (Figure 2, Item 12) onto the master cylinder (Figure 2, Item 13) and tighten down.
4. Connect the main hydraulic brake line connector (Figure 2, Item 5) to the distribution block (Figure 2, Item 9) and tighten down.
5. Install the five lock nuts (Figure 2, Item 1) onto the main hydraulic brake line mounting studs (Figure 2, Item 3) and tighten down.
6. Bleed brakes per this WP.

END OF TASK**REMOVAL (CROSS-OVER HYDRAULIC LINE)**

1. Ensure hand brakes are locked.
2. Ensure brake lockout is not engaged.

NOTE

When disconnecting brake line, brake fluid will drain out. Use drain pan to catch old brake fluid and discard properly.

3. Place a drain pan under each end of cross over hydraulic brake line.
4. Cut any zip ties securing the cross over brake line to the axle.
5. Disconnect cross over hydraulic brake line (Figure 2, Item 8) from the flexible brake line (Figure 2, Item 10). Remove and retain clip (Figure 2, Item 11).
6. Disconnect cross over hydraulic brake line (Figure 2 Item 8) from hydraulic brake line distribution block (Figure 2, Item 9).
7. Remove and discard brake line.

REPLACEMENT (CROSS-OVER HYDRAULIC LINE)

1. Place the cross over brake line (Figure 2, Item 8) into position.
2. Finger tighten the cross over brake line (Figure 2, Item 8) onto the hydraulic brake line distribution block (Figure 2, Item 9) on curb side of trailer.
3. Finger tighten cross over brake line (Figure 2, Item 8) onto the flexible brake line (Figure 2, Item 10) on street side of trailer and secure with clip (Figure 2, Item 11).
4. Tighten down both connections.

REPLACEMENT (CROSS-OVER HYDRAULIC LINE) - Continued

5. Place a zip tie around the cross over hydraulic brake line and axle. Tighten down.
6. Trim the end of the zip tie off.
7. Bleed brakes per this WP.

END OF TASK**REMOVAL (FLEXIBLE LINE)**

1. Ensure hand brakes are locked.
2. Ensure brake lockout is not engaged.

NOTE

When disconnecting brake line, brake fluid will drain out. Use collection container to catch old brake fluid and discard properly.

3. Place drain pans under both ends of the flexible brake lines (Figure 2, Item 3).
4. Disconnect the flexible brake line (Figure 2, Item 7) from the wheel cylinder (Figure 2, Item 6).
5. Disconnect the flexible brake line (Figure 2, Item 7) from the distribution block (Figure 2, Item 9). Remove and retain clip (Figure 2, Item 11).
6. Disconnect the flexible brake line (Figure 2, Item 10) from the wheel cylinder.
7. Disconnect the flexible brake line (Figure 2, Item 10) from the cross over hydraulic brake line (Figure 2, Item 8). Remove and retain clip (Figure 2, Item 11).
8. Discard brake lines.

END OF TASK**REPLACEMENT (FLEXIBLE LINE)**

1. Place the flexible line (Figure 2, Item 10) into position.
2. Finger tighten the flexible brake line (Figure 2, Item 10) onto the cross over brake line (Figure 2, Item 8). Retain with clip (Figure 2, Item 11).
3. Finger tighten the flexible brake line (Figure 2, Item 10) onto the wheel cylinder.
4. Tighten down connections.
5. Finger tighten the flexible brake line (Figure 2, Item 7) onto the distribution block (Figure 2, Item 9). Retain with clip (Figure 2, Item 11).
6. Finger tighten the flexible brake line (Figure 2, Item 7) onto the wheel cylinder (Figure 2, Item 6).
7. Tighten down connections.
8. Bleed brakes per this WP.

REPLACEMENT (FLEXIBLE LINE) - Continued

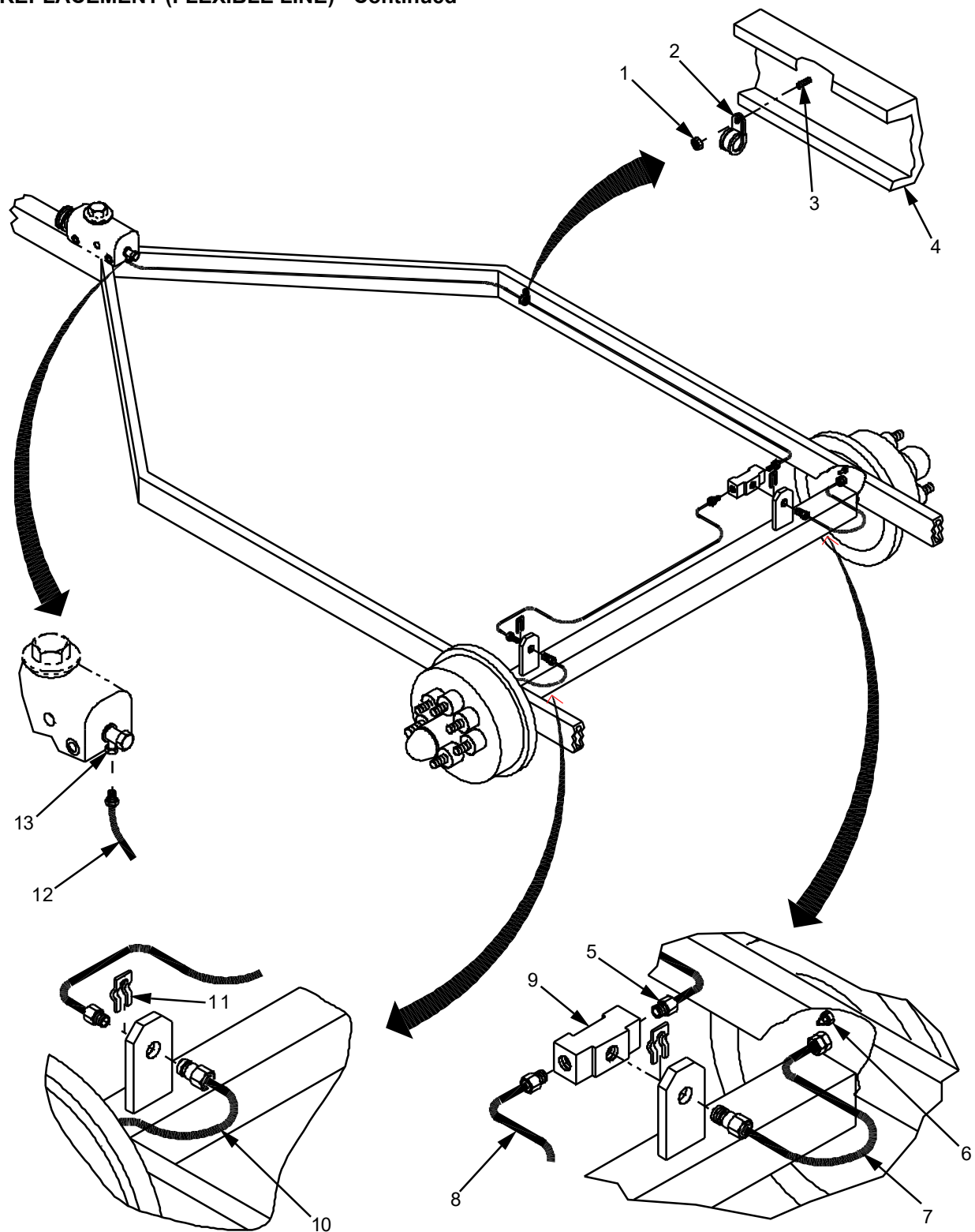


Figure 2. Brake Line Removal/Replacement.

END OF TASK

BLEED BRAKE SYSTEM

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Tow vehicle

References

WP 0005, WP 0021

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

Personnel must maintain a safe distance from the rear of trailer during this procedure.

NOTE

The preferred method to bleed brakes is to use a Filler and Bleeder Kit per the individual kit's instruction manual. If a Filler and Bleeder Kit is not available, perform the Bleed Brake System procedure in this WP as an alternate procedure.

BLEED BRAKE SYSTEM

1. Back trailer against a wall or other solid object to restrict personnel from rear of trailer.

CAUTION

Do not damage trailer cargo cross-member or tail light assemblies.

2. Ensure hand brakes are locked.
3. Ensure brake lockout is not engaged.
4. Fill master cylinder brake fluid reservoir per WP 0021 if necessary.
5. Attach tow vehicle to trailer and secure tongue jack assembly.

WARNING

Trailer may move during process. DO NOT lie under trailer while moving vehicle. Severe injury may result to personnel.

6. Using tow vehicle, push back against trailer to compress master cylinder.

BLEED BRAKE SYSTEM - Continued

7. Remove the rubber dust cover (Figure 3, Item 2) from the cylinder bleed valve (Figure 3, Item 1) on the curb side brake cylinder and set aside.
8. Connect plastic tube (Figure 3, Item 3) to the end of cylinder bleed valve (Figure 3, Item 1) and route tube into drain pan (Figure 3, Item 4).
9. Turn the curb side cylinder bleed valve (Figure 3, Item 1) 1/4 turn counter clockwise to loosen until air or fluid escapes valve.
10. When air/ fluid flow decreases, turn the cylinder bleed valve (Figure 3, Item 1) 1/4 turn clockwise to tighten.
11. Check master cylinder reservoir level and fill per WP 0021 if necessary.
12. Using tow vehicle, pull and push back against trailer 3 times, ending with vehicle pulling against trailer.
13. Repeat steps 6 through 10, until no air escapes cylinder bleed valve (Figure 3, Item 1).
14. Remove tube (Figure 3, Item 3) and replace rubber dust cover (Figure 3, Item 2) on to cylinder bleed valve (Figure 3, Item 1).
15. Repeat for street side brake cylinder.
16. Check master cylinder reservoir level and fill per WP 0021 if necessary.
17. Release trailer hand brakes.
18. Tow vehicle and stop, check that trailer tires brake.
19. Park trailer and disconnect tow vehicle.

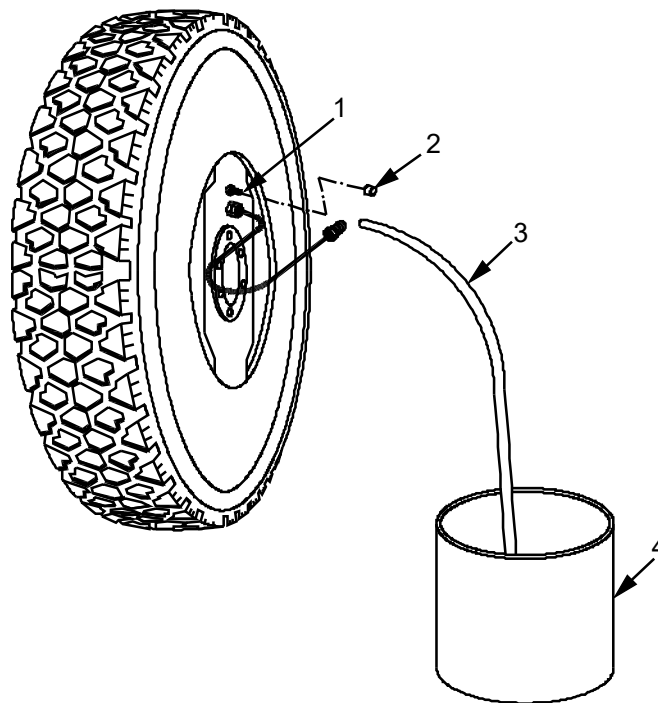


Figure 3. Bleed Brake System.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER BRAKES (BRAKE ACTUATOR AND HAND BRAKES)

GENERAL

This work package provides information on the removal and replacement of the following components:

- Brake actuator components removal and replacement
- Brake actuator assembly removal and replacement
- Hand brake assembly removal, inspect, and replacement
- Hand brake cable and sheath removal and replacement

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

AC voltage (208 VAC, 3Ø), (28 VAC), and DC voltage (+28 VDC), and current sufficient to cause serious injury or death are present. Before starting this task, ensure all power is de-energized and disconnected from shelter. Failure to comply with this warning could result in electrical shock or death to the individual.

Voltage sources, in addition to being an electrical shock hazard, may also potentially produce serious burns. Care should be exercised when using hand tools around exposed power connectors, never letting the tool bridge two terminals. Failure to observe this warning can result in serious injury or death.

Lunette is heavy. Use caution when removing and replacing.

BRAKE ACTUATOR COMPONENTS REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (2)

Materials/Parts

Actuator components

References

WP 0005, WP 0132

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

REMOVAL

1. Remove master cylinder as per (WP 0132).
2. Remove bolt (Figure 3, Item 1) and lock nut (Figure 3, Item 3) from shock absorber (Figure 3, Item 4).
3. Remove four lock nuts (Figure 1, Item 1) from sides of actuator mounting studs (Figure 1, Item 4).
4. Remove two actuator mounting brackets (Figure 1, Item 2) and four spacers (Figure 1, Item 3) from same side of actuator assembly and set aside.
5. Tap actuator mounting studs (Figure 1, Item 4), brackets (Figure 1, Item 2), spacers (Figure 1, Item 3), and lock nuts (Figure 1, Item 1) through to other side. Set parts aside.
6. Lower tow Pintle (Figure 2, Item 4) and actuator (Figure 2, Item 3) down from actuator assembly (Figure 2, Item 2). Remove actuator (Figure 2, Item 3).
7. If replacing breakaway lever, remove bolt (Figure 2, Item 5) and lock nut (Figure 2, Item 6) from actuator assembly (Figure 2, Item 2) and lift breakaway lever (Figure 2, Item 1) from actuator assembly (Figure 2, Item 2).
8. If replacing shock absorber (Figure 3, Item 4), remove bolt (Figure 3, Item 5) and lock nut (Figure 3, Item 12) from actuator (Figure 3, Item 10).

WARNING

Use caution when removing hydraulic push rod assembly due to spring tension.

9. If replacing hydraulic push rod (Figure 3, Item 6), washer (Figure 3, Item 8), and spring (Figure 3, Item 7), place actuator (Figure 3, Item 10) on a suitable work surface and remove bolt (Figure 3, Item 9) and self-locking nut (Figure 3, Item 11) from hydraulic push rod assembly (Figure 3, Item 13).

END OF TASK

REPLACEMENT**WARNING**

Use caution when installing hydraulic push rod assembly due to spring tension.

1. If replacing hydraulic push rod (Figure 3, Item 6), washer (Figure 3, Item 8), and spring (Figure 3, Item 7), place actuator (Figure 3, Item 10) on a suitable work surface and insert bolt (Figure 3, Item 9) through actuator (Figure 3, Item 10) and hydraulic push rod assembly (Figure 3, Item 13). Secure with self-locking nut (Figure 3, Item 11) and tighten.
2. If replacing shock absorber (Figure 3, Item 4), insert bolt (Figure 3, Item 5) through shock absorber (Figure 3, Item 4) and actuator (Figure 3, Item 10) and secure with lock nut (Figure 3, Item 12).
3. If replacing breakaway lever, slide breakaway lever (Figure 3, Item 1) into slot in actuator assembly (Figure 2, Item 2) and insert bolt (Figure 2, Item 5) through actuator assembly (Figure 2, Item 2) and breakaway lever (Figure 2, Item 1) and secure with lock nut (Figure 2, Item 6).
4. Raise tow pintle (Figure 2, Item 4) and actuator (Figure 2, Item 3) into actuator assembly (Figure 2, Item 2).
5. Ensure that breakaway lever (Figure 2, Item 1) slides into slot in actuator groove (Figure 2, Item 3).
6. Insert actuator mounting studs (Figure 1, Item 4), mounting brackets (Figure 1, Item 2), spacers (Figure 1, Item 3), and lock nuts (Figure 1, Item 1) into one side of actuator assembly (Figure 1, Item 5).
7. Install actuator mounting brackets (Figure 1, Item 2), spacers (Figure 1, Item 3), and lock nuts (Figure 1, Item 1) on other side of actuator assembly (Figure 3, Item 5).
8. Install bolt (Figure 3, Item 1) through shock absorber (Figure 3, Item 4) and actuator (Figure 3, Item 2). Secure with lock nut (Figure 3, Item 3). Tighten all hardware.
9. Install master cylinder as per WP 0132.

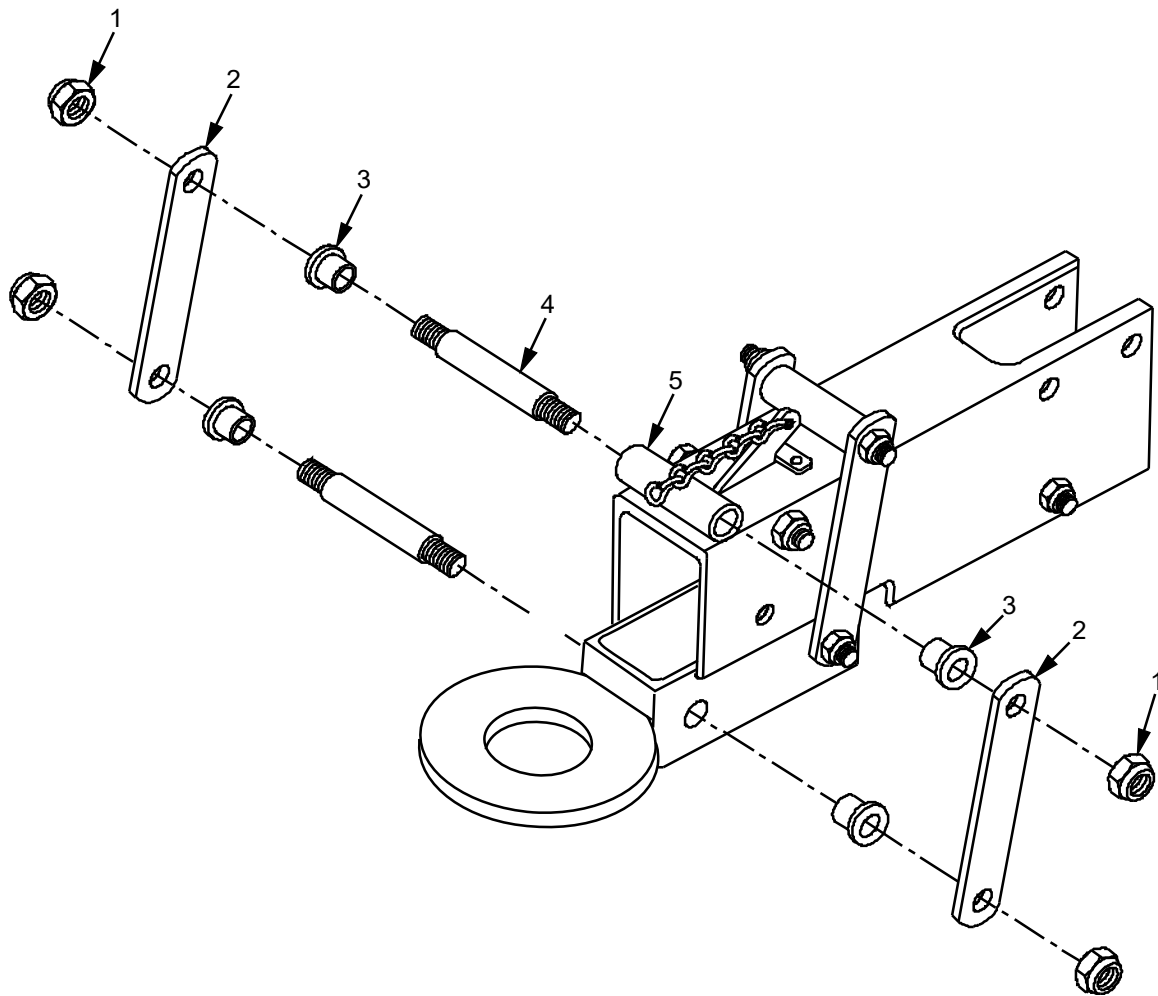


Figure 1. Brake Actuator Mounting Brackets Removal/Replacement.

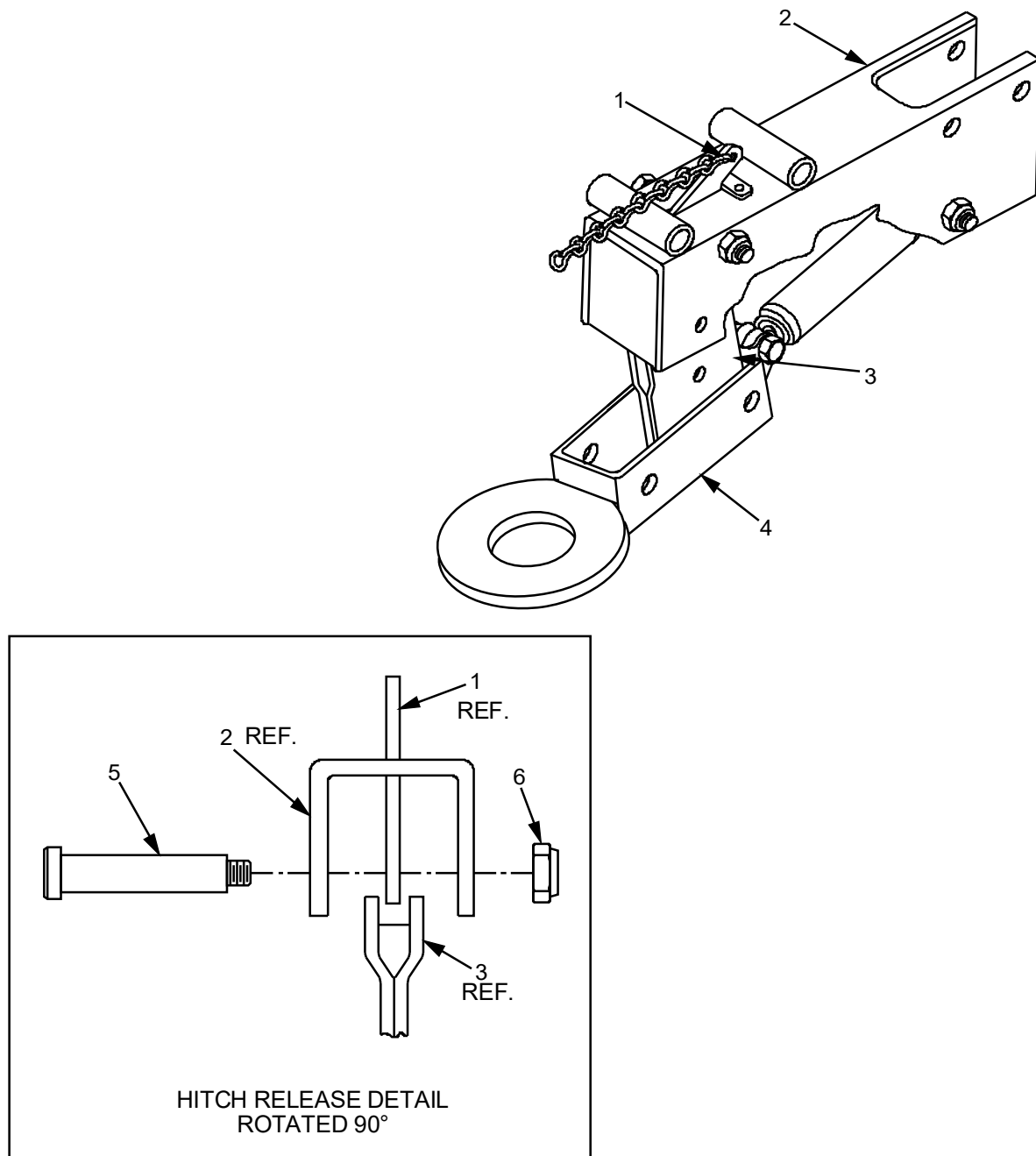


Figure 2. Tow Pintle and Breakaway Lever Removal/Replacement.

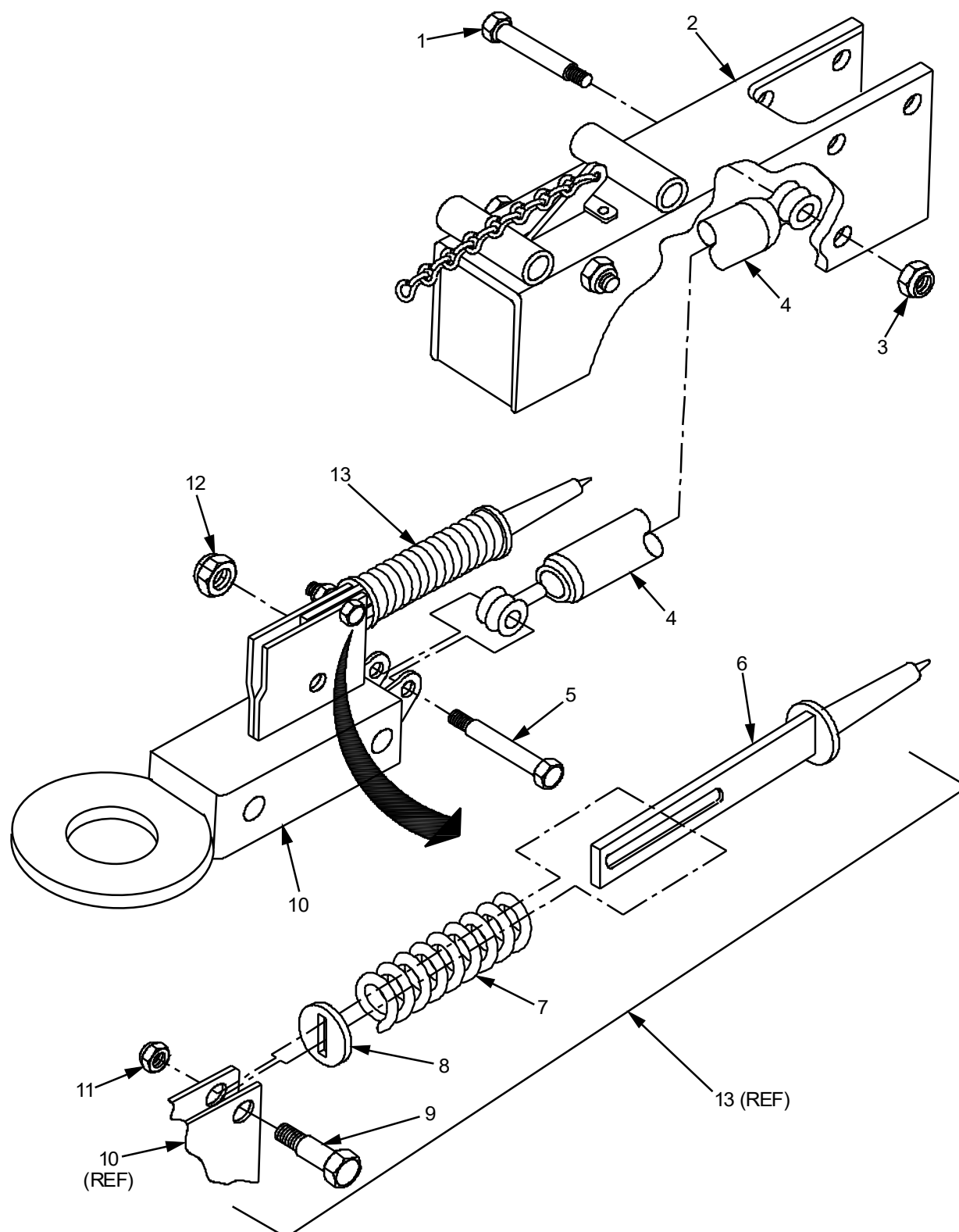


Figure 3. Brake Actuator Shock Absorber and Hydraulic Push Rod Removal/Replacement.

END OF TASK

BRAKE ACTUATOR ASSEMBLY REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard automotive tool set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (2)

Materials/Parts

Actuator assembly

References

WP 0005, WP 0132

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

BRAKE ACTUATOR ASSEMBLY**REMOVAL**

1. Remove main hydraulic brake line from master cylinder (refer to WP 0132, if necessary).
2. Remove two bolts (Figure 4, Item 6), split lock washers (Figure 4, Item 7), and flat washers (Figure 4, Item 8) that secure brake actuator assembly (Figure 4, Item 1) to trailer (Figure 4, Item 9) from underneath trailer.
3. Remove two bolts (Figure 4, Item 2), split lock washers (Figure 4, Item 4), locknuts (Figure 4, Item 5), and four flat washers (Figure 4, Item 3) that secure brake actuator assembly (Figure 4, Item 1) to trailer (Figure 4, Item 9) from above trailer.
4. Carefully lift and remove actuator assembly (Figure 4, Item 1) from trailer tongue (Figure 4, Item 9).

END OF TASK**REPLACEMENT**

1. Place actuator assembly (Figure 4, Item 1) into recessed area of trailer tongue (Figure 4, Item 9).
2. From underneath the trailer tongue and actuator assembly, insert two bolts (Figure 4, Item 6), flat washers (Figure 4, Item 8), and split washers (Figure 4, Item 7) through trailer tongue (Figure 4, Item 9) and actuator assembly (Figure 4, Item 1).
3. From above the trailer tongue, insert two bolts (Figure 4, Item 2) and flat washers (Figure 4, Item 4) through actuator assembly (Figure 1, Item 1) and trailer tongue (Figure 1, Item 9). Secure with two flat washers (Figure 4, Item 3), split washers (Figure 4, Item 4), and lock nuts (Figure 4, Item 5) (refer to WP 0150 for torque requirements).
4. Attach main hydraulic brake line to master cylinder (refer to WP 0132, if necessary).
5. Fill master cylinder and bleed brakes as necessary (refer to WP 0132).

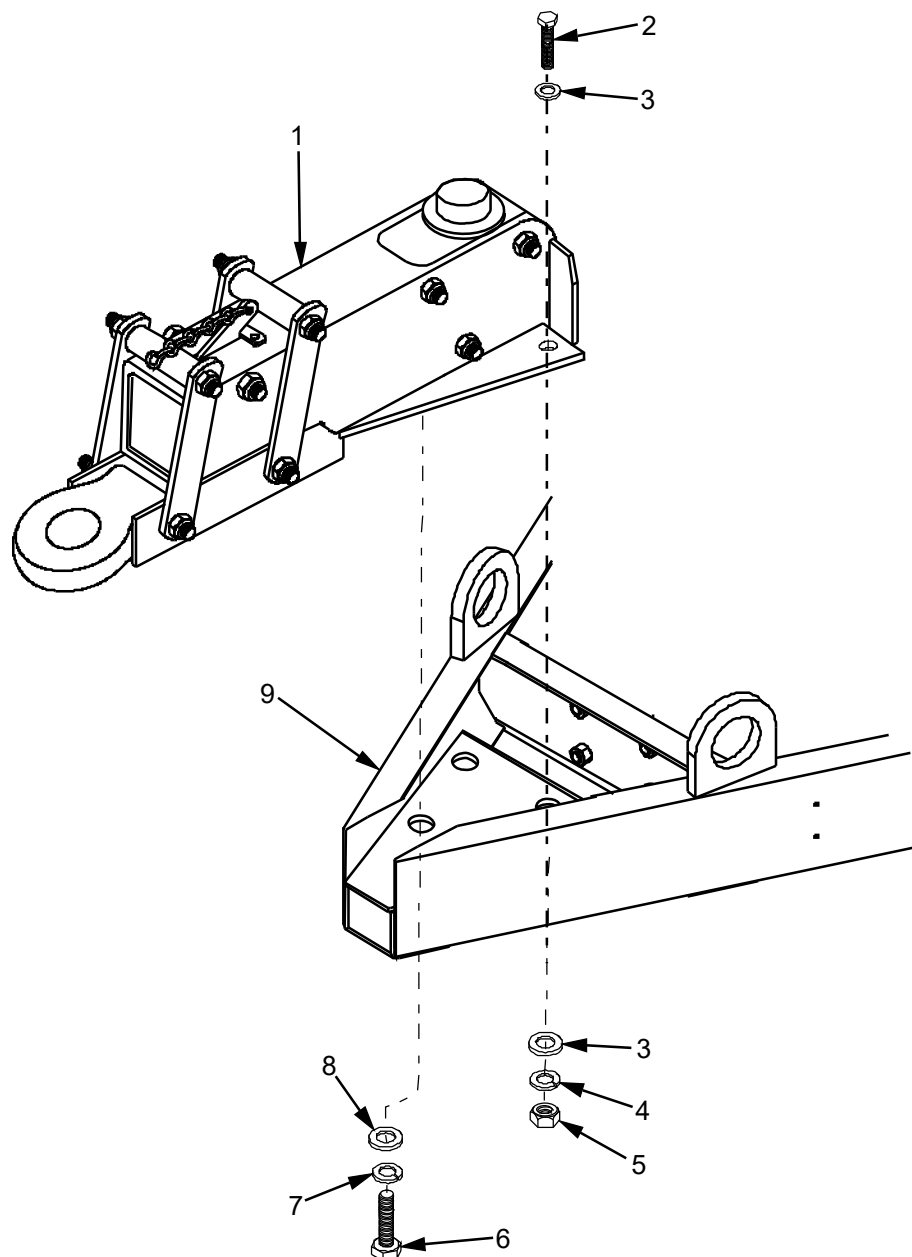


Figure 4. Brake Actuator Assembly (New Version) Removal/Replacement.

END OF TASK

HAND BRAKE ASSEMBLY REMOVAL/INSPECT/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Hand brake assembly
Dry cleaning solvent (WP 0180, Item 11)
Cloth, cleaning (WP 0180, Item 14)

References

None

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

REMOVAL

1. Unlock hand brake to be removed.
2. Turn adjustment knob (Figure 5, Item 17) on hand brake lever to be removed to provide slack in cable (Figure 5, Item 3).
3. Remove two locknuts (Figure 5, Item 13), two spacers (Figure 5, Item 14), and two bolts (Figure 5, Item 15) securing hand brake assembly (Figure 5, Item 16) to frame. Discard locknuts.
4. Remove two bolts (Figure 5, Item 5), spacers (Figure 5, Item 6), and lock nuts (Figure 5, Item 9) from hand brake lever assembly (Figure 5, Item 16). Retain front (Figure 5, Item 7) and back (Figure 5, Item 8) cable mounting plates.
5. Using long nose pliers, remove cotter pin (Figure 5, Item 2) from clevis pin (Figure 5, Item 18) and remove clevis pin and washer (Figure 5, Item 1) from hand brake lever assembly (Figure 5, Item 16). Discard cotter pin.
6. Remove cable (Figure 5, Item 3) from hand brake lever assembly (Figure 5, Item 16).

END OF TASK

INSPECT**WARNING**

Dry cleaning solvent, P-D-680, is toxic and flammable. Always wear protective goggles and gloves and use solvent only in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F to 138°F (38°C to 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

1. If reusing any components of hand brake assembly, clean components with dry cleaning solvent and allow to dry.
2. Inspect hand brake cable end (Figure 5, Item 19) for excessive wear or damage. Replace if necessary.
3. Inspect clevis pin (Figure 5, Item 18) for excessive wear or damage. Replace if necessary.
4. Inspect cable assembly (Figure 5, Item 3) for frays, cracks, distortion, or seized cable in sheath. Replace if necessary.
5. Inspect all threaded surfaces for damage. Replace any component if damaged.
6. Inspect hand brake lever (Figure 5, Item 4) and replace if necessary.

END OF TASK**REPLACEMENT****CAUTION**

Do not push cable back through sheath. Cable may disconnect from hand brake lever in wheel assembly which will cause hand brake failure.

1. Install clevis pin (Figure 5, Item 18) and washer (Figure 5, Item 1) through hand brake assembly (Figure 5, Item 16), hand brake lever (Figure 5, Item 4) and hand brake cable (Figure 5, Item 3) and secure with cotter pin (Figure 5, Item 2).
2. Position front (Figure 5, Item 7) and back (Figure 5, Item 8) cable mounting plates around hand brake cable (Figure 5, Item 3).
3. Install two bolts (Figure 5, Item 5), spacers (Figure 5, Item 6), and nuts (Figure 5, Item 9) into hand brake lever assembly (Figure 5, Item 16).
4. Install two bolts (Figure 5, Item 15), two spacers (Figure 5, Item 14), and two new locknuts (Figure 5, Item 13) securing hand brake assembly (Figure 5, Item 16) to frame.
5. Turn adjustment knob (Figure 5, Item 17) until hand brake lever has one-third slack travel from the disengaged position to the engaged position.
6. Turn adjustment knob slightly to make minor adjustments to hand brake tension.

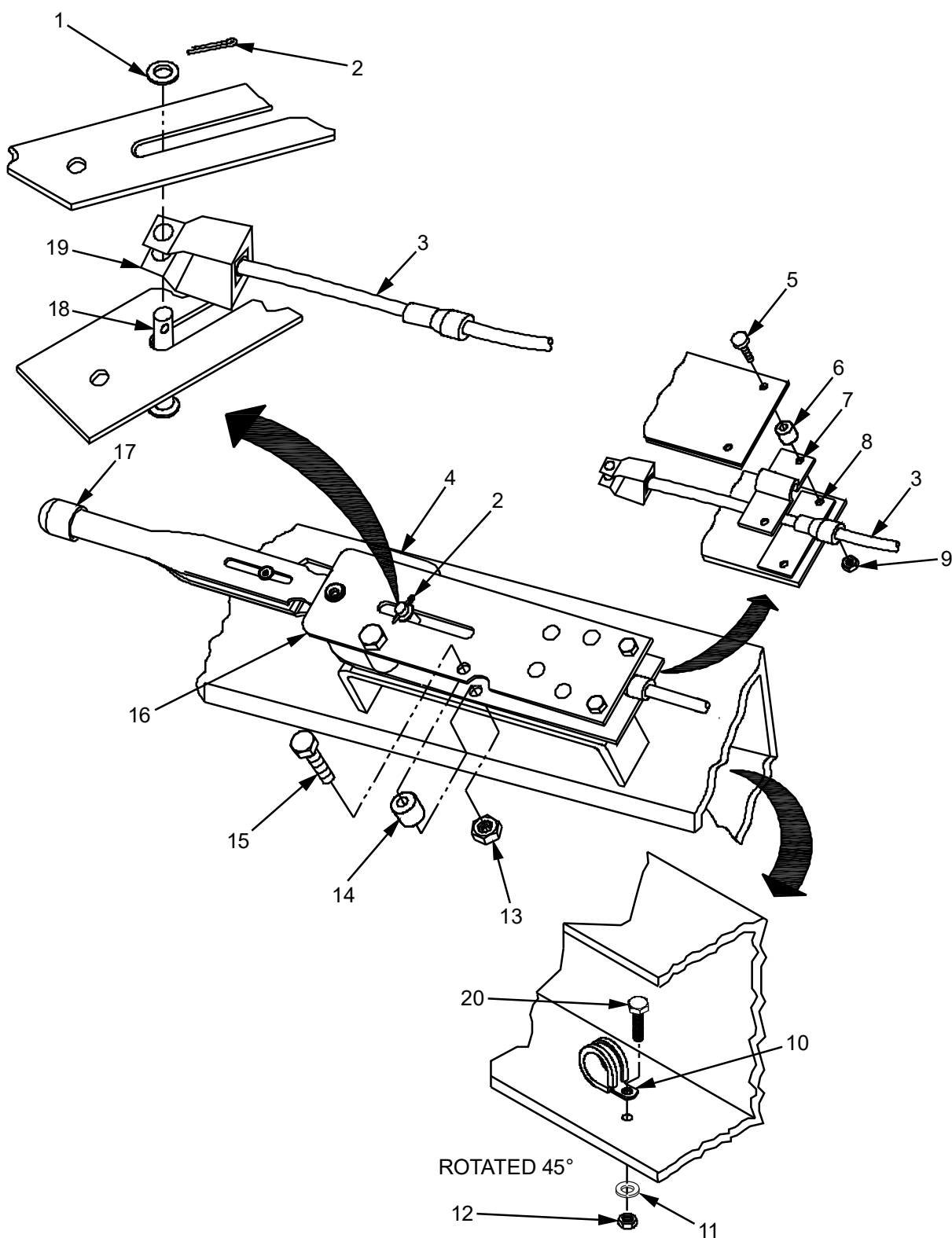


Figure 5. Hand Brake Removal/Replacement.

END OF TASK

HAND BRAKE CABLE AND SHEATH REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

General mechanic's tool kit (WP 0132, Item 1)
Standard Automotive Tool Set (WP 0132, Item 5)

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (1)

Materials/Parts

Hand brake cable and sheath

References

WP 0132, WP 0134

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

WARNING

When performing maintenance on brake system, ensure that wheels are securely chocked. Failure to follow this warning may cause trailer to roll, resulting in serious injury or death to personnel or damage to equipment.

REMOVAL

1. Remove hand brake assembly as per this WP.
2. Remove three bolts (Figure 5, Item 11) and lock nuts (Figure 6, Item 12) securing clamps (Figure 6, Item 10) and hand brake cable sheath (Figure 6, Item 3) to frame.
3. Remove clamps (Figure 5, Item 10) from cable sheath (Figure 6, Item 3).
4. Remove hand brake cable (Figure 5, Item 3) from frame.
5. Remove tire and wheel assembly as per (WP 0134).
6. Remove brake hub/drum as per (WP 0132).
7. Using a flat tip screw driver pry the end of the parking brake cable (Figure 6, Item 5) from the parking brake lever (Figure 6, Item 3).
8. Grasp the nut (Figure 6, Item 7) on the lock securing the outer brake cable (Figure 6, Item 1) to the back of the backing plate (Figure 6, Item 4) with vice grips or channel locks.
9. While pressing on the internal flanges (Figure 6, Item 6), using a twisting motion twist and pull the brake cable lock (Figure 6, Item 2) away from the backing plate (Figure 6, Item 4) to release.
10. Remove brake cable (Figure 6, Item 2).

END OF TASK

REPLACEMENT

1. Insert cable (Figure 6, Item 1) through hole in backing plate (Figure 6, Item 4).
2. Holding nut (Figure 6, Item 7) with vice grips or channel locks, twist and push cable into hole in back of backing plate (Figure 6, Item 4) to lock internal flanges (Figure 6, Item 6) into position.
3. Using needle nose channel locks, pull spring back from tip of cable to expose cable.
4. Lower cable (Figure 6, Item 5) into groove on hand brake lever (Figure 6, Item 3) so that clip is fully seated in lever.
5. Release needle nose channel locks.
6. Place clamps in approximate locations on cable (Figure 6, Item 3) and place cable in approximate location along frame.
7. Install three bolts (Figure 6, Item 11) and lock nuts (Figure 6, Item 12) to secure clamps (Figure 6, Item 10) and hand brake cable sheath (Figure 6, Item 3) to frame.
8. Install hand brake assembly as per this WP.
9. Replace brake drum as per WP 0132.
10. Replace tire and wheel assembly as per WP 0134.

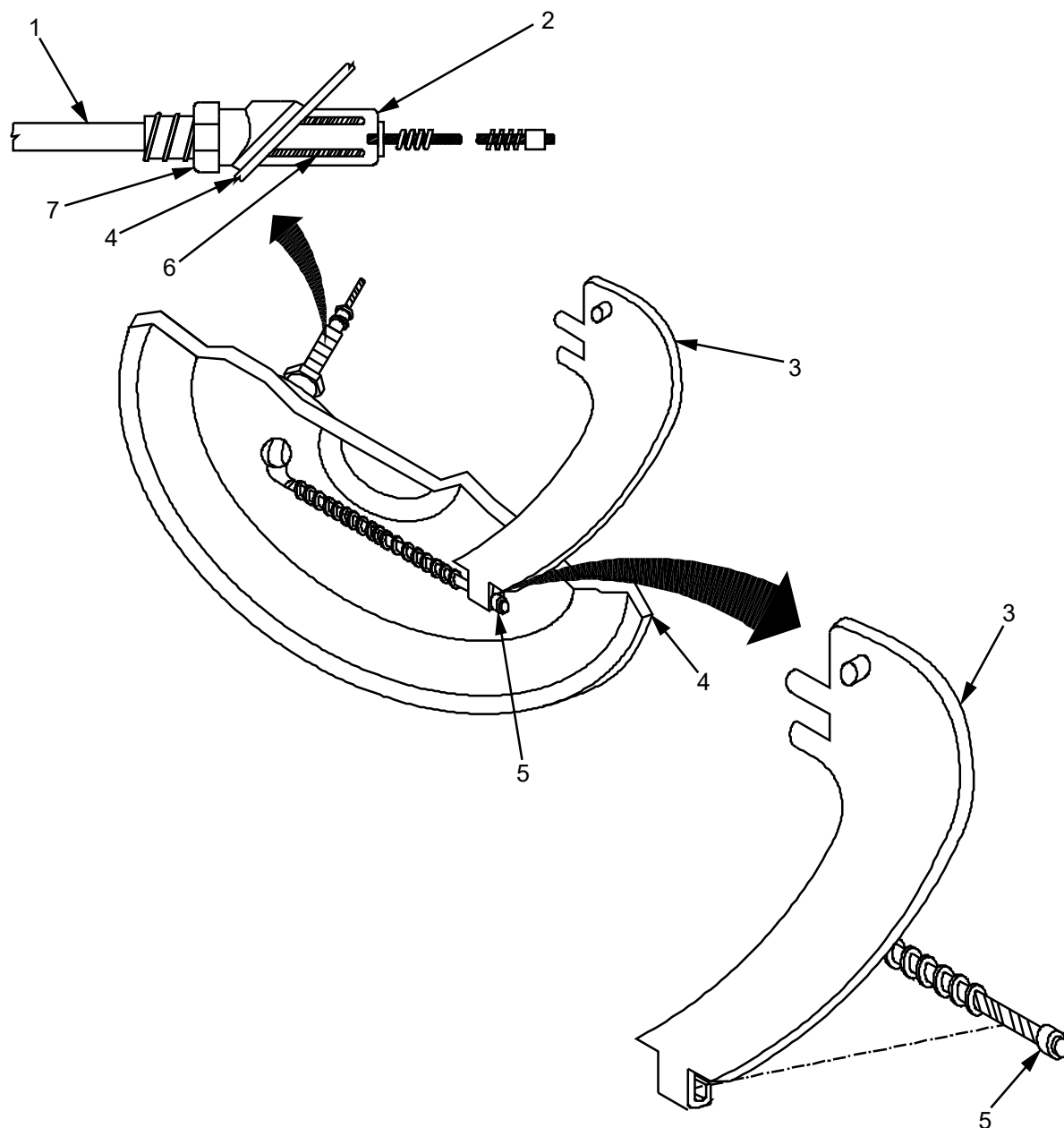


Figure 7. Hand Brake and Sheath Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS
HP-2C/185 UST Trailer
TRAILER TIRE AND WHEEL ASSEMBLY

GENERAL

This work package provides information on the service, removal, and replacement of the trailer tire and wheel assembly.

If necessary, refer to (WP 0004) for the controls, indicators, and connectors of the trailer.

WARNING

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Trailer could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

Observe all lifting and weight restrictions. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

TIRE AND WHEEL ASSEMBLY SERVICE/REMOVAL/REPLACEMENT

INITIAL SETUP**Tools and Special Tools**

Standard Automotive Tool Set (WP 0132, Item 5)
Jack stand
Tire gauge

Personnel Required

Wheeled Vehicle Mechanic, MOS
91B (2)

Materials/Parts

Wheel and run-flat assembly

References

none

Equipment Condition

Trailer handbrakes engaged
Trailer parked & wheels chocked

SERVICE

1. Remove and retain tire valve cover.
2. Place tire pressure gauge on air valve and press down firmly. Tire pressure gauge should read 17 psi for off-road and 20 psi for on road.
3. Read the tire pressure indicated on the gauge.
4. If necessary, add or delete air.
5. Repeat steps 2 through 4 until appropriate reading on tire pressure gauge is obtained.
6. Replace valve cover.

END OF TASK

REMOVAL**WARNING**

When the following procedure is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

Personnel performing this procedure should have another person nearby in case an adverse situation occurs. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

Prior to performing any maintenance that requires climbing on or under trailer, set trailer handbrakes and chock wheels. Injury to personnel could result from trailer suddenly rolling or tipping.

Prior to performing the following procedure ensure that HP-2C/185 UST Trailer is level and ground is stable (not soggy or soft). Jack could sink into soft or unstable ground. Injury to personnel, or damage to HP-2C/185 UST Trailer and/or its components could result from trailer suddenly rolling or tipping.

Tire and wheel assembly weight in excess of 110 lbs. Removal and replacement require a two person lift to avoid personal injury.

CAUTION

Prior to performing the following procedure ensure that HP-2C/185 UST Trailer is out of service. No power cables or duct should be connected to the ECU or Genset.

Failure to observe this caution could result in serious damage to the HP-2C/185 UST Trailer and/or its contents.

1. Remove all loose items from trailer and cargo area.
2. Verify that ECU has been shut down in accordance with ECU Stop Procedure (WP 0005).
3. Verify that Genset has been shut down, engine is cool and that BATTERY switch is set to OFF. (WP 0005, Genset Stop Procedure).
4. Verify that trailer wheels are chocked, hand brakes are locked.

NOTE

If lug nut does not break loose, do not attempt to force, wheel stud could break. Threads on some wheel studs are reversed (right is loose, left is tight).

5. Loosen but do not remove eight lug nuts (Figure 1, Item 1).
6. Place 3 ton hydraulic jack under trailer frame near wheel assembly (Figure 1, Item 2) to be removed.

REMOVAL – Continued**NOTE**

If tire is flat when performing the following step, trailer will need to be raised to a height sufficient enough to install a fully inflated wheel assembly (Figure 1, Item 2).

Prior to raising trailer make sure that stabilizer leg on opposite side of trailer is not down.

7. Using three-ton jack, raise trailer to sufficient height where fully inflated wheel assembly (Figure 1, Item 2) may be installed.
8. Place three-ton jack stand (Figure 1, Item 4) under trailer axle between wheel assembly (Figure 1, Item 2) and axle mount. Raise jack stand (Figure 1, Item 4) to meet trailer axle. Lower trailer onto jack stand (Figure 1, Item 4).

REMOVAL – Continued**WARNING**

Never remove tire and wheel assembly with trailer supported on hydraulic jack. Jack may collapse, causing injury to personnel and damage to equipment.

When the following step is being performed, the trailer is in a very unstable position. This procedure should be performed in a timely manner and the trailer should not be left unattended. Failure to observe this warning can result in serious injury or death to personnel or damage to the HP-2C/185 UST Trailer and/or its contents.

9. Remove and retain eight lug nuts (Figure 1, Item 1).
10. Remove wheel assembly (Figure 1, Item 2) and set aside.

END OF TASK**REPLACEMENT**

1. Verify that trailer is high enough to accept wheel assembly (Figure 1, Item 2).

NOTE

Prior to installing wheel assembly, perform visual inspection of trailer area now visible by tire assembly being removed. If any leaks or other visible damage is present, notify your supervisor.

Prior to installing wheel assembly, perform visual inspection of wheel assembly. Make sure tread is not excessively worn, no excessive cracking or wear of side walls or no deterioration of rubber is present.

Prior to installing wheel assembly check pressure (off-road - 17 psi; on road -20 psi). If necessary adjust pressure.

2. Install wheel assembly (Figure 1, Item 2) by aligning lug nut studs (Figure 1, Item 3) with corresponding holes in wheel assembly (Figure 1, Item 2).

CAUTION

When the following step is being performed, do not force lug nuts or cross threads. Failure to observe this caution can result in damage to the HP-2C/185 UST Trailer.

3. Keeping wheel assembly (Figure 1, Item 2) straight up and down, slide wheel assembly (Figure 1, Item 2) onto studs (Figure 1, Item 3) and hold back. Install eight lug nuts (Figure 1, Item 1) and tighten finger tight.
4. Alternately tighten lug nuts using a crossing pattern.
5. Place three-ton hydraulic jack under trailer frame (near wheel assembly (Figure 1, Item 2) being replaced and raise trailer high enough to remove jack stand (Figure 1, Item 4).
6. Slowly lower trailer so that wheel assembly (Figure 1, Item 2) is supporting weight of trailer.

REPLACEMENT – Continued**CAUTION**

When the following step is being performed, do not over tighten lug nuts. Studs could break off or wheels could be extremely difficult to remove next time.

7. Using a crossing pattern, verify that all lug nuts (Figure 1, Item 1) are tight. Torque lug nuts to 100 ± 5 lb – ft (136 ± 7 N·m).
8. Start Genset in accordance with Genset Start Procedure (WP 0005) of this TM.

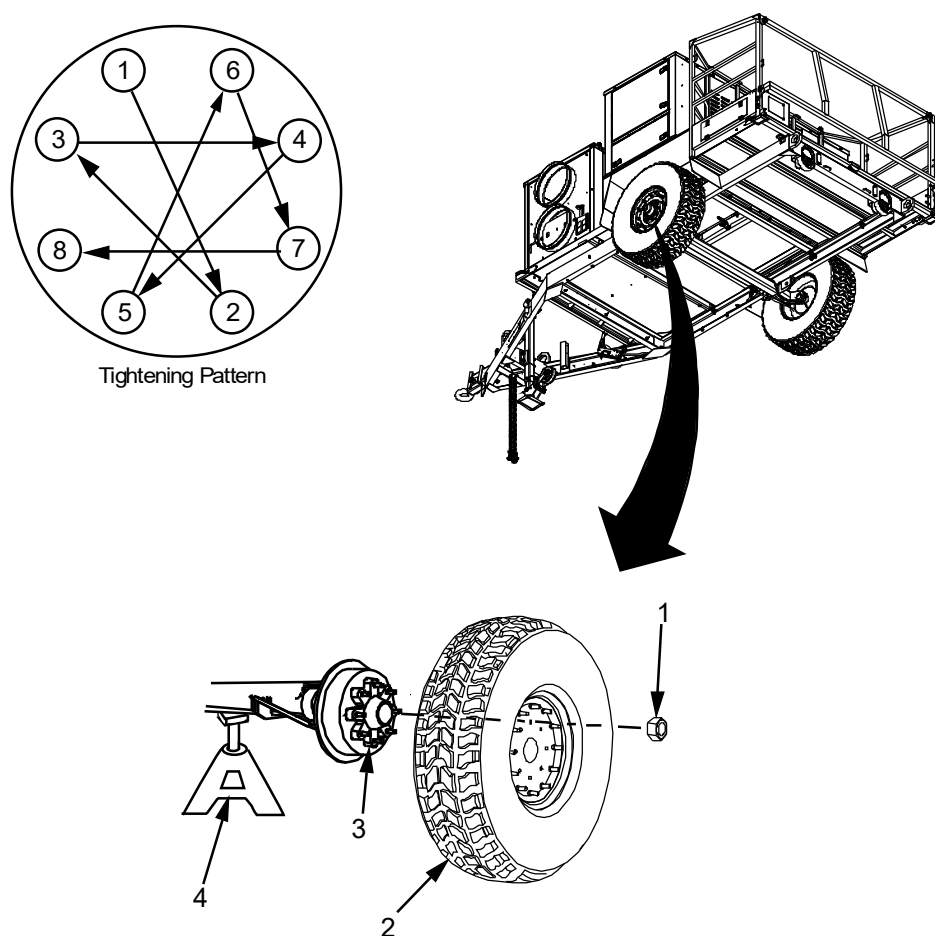


Figure 1. Wheel Assembly Removal/Replacement.

END OF TASK

END OF WORK PACKAGE

CHAPTER 9

PARTS INFORMATION

FOR

HP-2C/185 UST TRAILER

PARTS INFORMATION
HP-2C/185 UST Trailer
INTRODUCTION

SCOPE

This RPSTL lists the authorized spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of the field maintenance of the HP-2C/185 UST Trailer. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

GENERAL

In addition to the Introduction work package, this RPSTL is divided into the following work packages.

1. Repair Parts List Work Packages. Work packages containing lists of spare and repair parts authorized for use in the performance of maintenance at the levels determined by the MAC/SMR code. These work packages also include parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending Figure and item number sequence. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in the Bulk Items work package which follows the last Parts List work package. Repair parts kits are listed separately in their own functional group and work package. Repair parts for reparable special tools are also listed in a separate work package. Items listed are shown on the associated illustrations.

2. Special Tools List Work Packages. This work package lists those special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC) column). Tools that are components of common tool sets and/or Class VII are not listed.

3. Cross-Reference Indexes Work Packages. There are two cross-reference indexes work packages in this RPSTL. The National Stock Number (NSN) Index work package refers you to the Figure and item number for each NSN listed in the RPSTL. The Part Number Index work package refers you to the Figure and item number for each part number listed in the RPSTL.

EXPLANATION OF ENTRIES IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES

ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.

SMR CODE (Column (2)). The SMR code containing supply/requisitioning information, maintenance level authorization criteria, and disposition instruction, as shown in the following breakout. This entry may be subdivided into 4 subentries, one for each service.

Table 1. SMR Code Explanation.

<u>Source Code</u>	<u>Maintenance Code</u>		<u>Recoverability Code</u>
<u>XX</u>	<u>X</u>	<u>X</u>	<u>X</u>
1st two positions: How to get an on item. items.	3rd position: Who can install, replace, or use the item.	4th position: Who can do complete repair on the item.	5th position: Who determines disposition action unserviceable

NOTE

Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of "Repair" function in a use/user environment in order to restore serviceability to a failed item

Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

Table 2. Source Code Explanation.

<u>Source Code</u>	<u>Application/Explanation</u>
PA	
PB	
PC	
PD	Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the third position of the SMR code.
PE	
PF	
PG	
PH	
PR	
PZ	
	NOTE
	Items coded PC are subject to deterioration.
KD	Items with these codes are not to be requisitioned /requested individually.
KF	They are part of a kit that is authorized to the maintenance level indicated in the third position of the SMR code. The complete kit must be requisitioned and applied.
KB	
MF-Made at maintainer class	Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the P/N in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work package of the RPSTL. If the item is authorized to you by the third position code of the SMR code, but the source code indicates it is made at higher level, order the item from the higher level of maintenance.
MH-Made at below depot/sustainment class	
ML-Made at SRA	
MD-Made at depot	
AF-Assembled by maintainer class	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the third position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
AH-Assembled by below depot sustainment class	
AL-Assembled by SRA	
AD-Assembled by depot	
XA	Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to NOTE below).
XB	If an item is not available from salvage, order it using the CAGEC and P/N.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by the manufacturer's P/N.
XD	Item is not stocked. Order an XD-coded item through local purchase or normal supply channels using the CAGEC and P/N given, if no NSN is available.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes except for those items source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR codes as follows:

Third Position. The maintenance code entered in the third position tells you the lowest maintenance class authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to the following classes of maintenance:

Maintenance

<u>Code</u>	<u>Application/Explanation</u>
C -	Crew
F -	Maintainer maintenance can remove, replace, and use the item.
H -	Below Depot Sustainment maintenance can remove, replace, and use the item.
L -	Specialized repair activity can remove, replace, and use the item.
K -	Contractor facility can remove, replace, and use the item.
Z -	Item is not authorized to be removed, replaced, or used at any maintenance level.
D -	Depot can remove, replace, and use the item.

NOTE

Army will use C in the third position. However, for joint service publications, other services may use O

Fourth position. The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance class with the capability to do complete repair (perform all authorized repair functions).

Maintenance

<u>Code</u>	<u>Application/Explanation</u>
C -	Crew (operator) is the lowest class that can do complete repair
F -	Maintainer is the lowest class that can do complete repair of the item.
H -	Below Depot Sustainment is the lowest class that can do complete repair of the item.
L -	Specialized repair activity (enter specialized repair activity or TASMG designator) is the lowest class that can do complete repair of the item.

**Maintenance
Code****Application/Explanation**

D -	Depot is the lowest class that can do complete repair of the item.
K -	Complete repair is done at contractor facility.
Z -	Nonrepairable. No repair is authorized.
B -	No repair is authorized. No parts or special tools are authorized for maintenance of "B" coded item. However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is shown in the fifth position of the SMR code as follows:

**Recoverability
Code****Application/Explanation**

Z - of	Nonrepairable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
F -	Reparable item. When uneconomically repairable, condemn and dispose of the item at the field level.
H -	Reparable item. When uneconomically repairable, condemn and dispose of the item at the below depot sustainment.
D -	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot.
L -	Reparable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).
A -	Item requires special handling or condemnation procedures because of specific reasons (such as precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

NSN (Column (3)). The NSN(s) for the item is listed in this column.

CAGEC (Column (4)). The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

PART NUMBER (Column (5)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

NOTE

When you use an NSN to requisition an item, the item you receive may have a different part number from the number listed.

DESCRIPTION AND USABLE ON CODE (UOC) (Column (6)). This column includes the following information:

1. The federal item name, and when required, a minimum description to identify the item.
2. Part numbers of any bulk materials required if the item is to be locally manufactured or fabricated.
3. Hardness Critical Item (HCI). Items that require special handling or procedures to ensure protection against electrostatic pulse (EMP) damage are marked with the letters "HCI".
4. The statement END OF FIGURE appears below the last item description in column (6) for each Figure in the repair parts list, special tools repair parts, kits, bulk items, and special tools list work packages.

QTY (Column (7)). The QTY (quantity per Figure) column indicates the quantity of the item used in the breakout shown on the illustration/Figure. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and quantity may change from application to application.

EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS

1. National Stock Number (NSN) Index Work Package. NSN's in this index are listed in National Item Identification Number (NIIN) sequence.

STOCK NUMBER Column. This column lists the NSN in NIIN sequence. The NIIN consists of the last nine digits of the NSN. When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

For example, if the NSN is 5385-01-574-1476, the NIIN is 01-574-1476.

FIG. Column. This column lists the number of the Figure where the item is identified/located. The Figures are in numerical order in the repair parts list and special tools list work packages.

ITEM Column. The item number identifies the item associated with the Figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

2. Part Number (P/N) Index Work Package. Part Numbers in this index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combinations which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

PART NUMBER Column. This column indicates the part number assigned to the item.

FIG. Column. This column lists the number of the Figure where the item is identified/located in the repair parts list and special tools list work packages.

ITEM Column. The item number is the number assigned to the item as it appears in the Figure referenced in the adjacent Figure number column.

SPECIAL INFORMATION

UOC. The UOC appears in the lower left corner of the Description Column heading. Usable on codes are shown as "UOC:" in the Description Column (justified left) on the first line under the applicable item/nomenclature. Uncoded items are applicable to all models. Examples of the UOCs used in the RPSTL are:

<u>Code</u>	<u>Used On</u>
NA	
NA	

Fabrication Instructions. Bulk materials required to manufacture items are listed in the bulk material work package of this RPSTL. Part numbers for bulk material are also referenced in the Description Column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in (enter applicable TM number).

Index Numbers. Items which have the word BULK in the Figure column will have an index number shown in the item number column. This index number is a cross-reference between the NSN / Part Number (P/N) Index work packages and the bulk material list in the bulk items work package.

HOW TO LOCATE REPAIR PARTS**1. When NSNs or Part Numbers Are Not Known.**

First. Using the table of contents, determine the assembly group to which the item belongs. This is necessary since Figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.

Second. Find the Figure covering the functional group or subfunctional group to which the item belongs.

Third. Identify the item on the Figure and note the number(s).

Fourth. Look in the repair parts list work packages for the Figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

2. When NSN Is Known.

First. If you have the NSN, look in the STOCK NUMBER column of the NSN index work package. The NSN is arranged in NIIN sequence. Note the Figure and item number next to the NSN.

Second. Turn to the Figure and locate the item number. Verify that the item is the one for which you are looking for.

3. When Part Number Is Known.

First. If you have the part number and not the NSN, look in the PART NUMBER column of the part number index work package. Identify the Figure and item number.

Second. Look up the item on the Figure in the applicable repair parts list work package.

ABBREVIATIONS

Not Applicable.

END OF WORK PACKAGE

PARTS INFORMATION
HP-2C/185 UST Trailer
REPAIR PARTS LIST

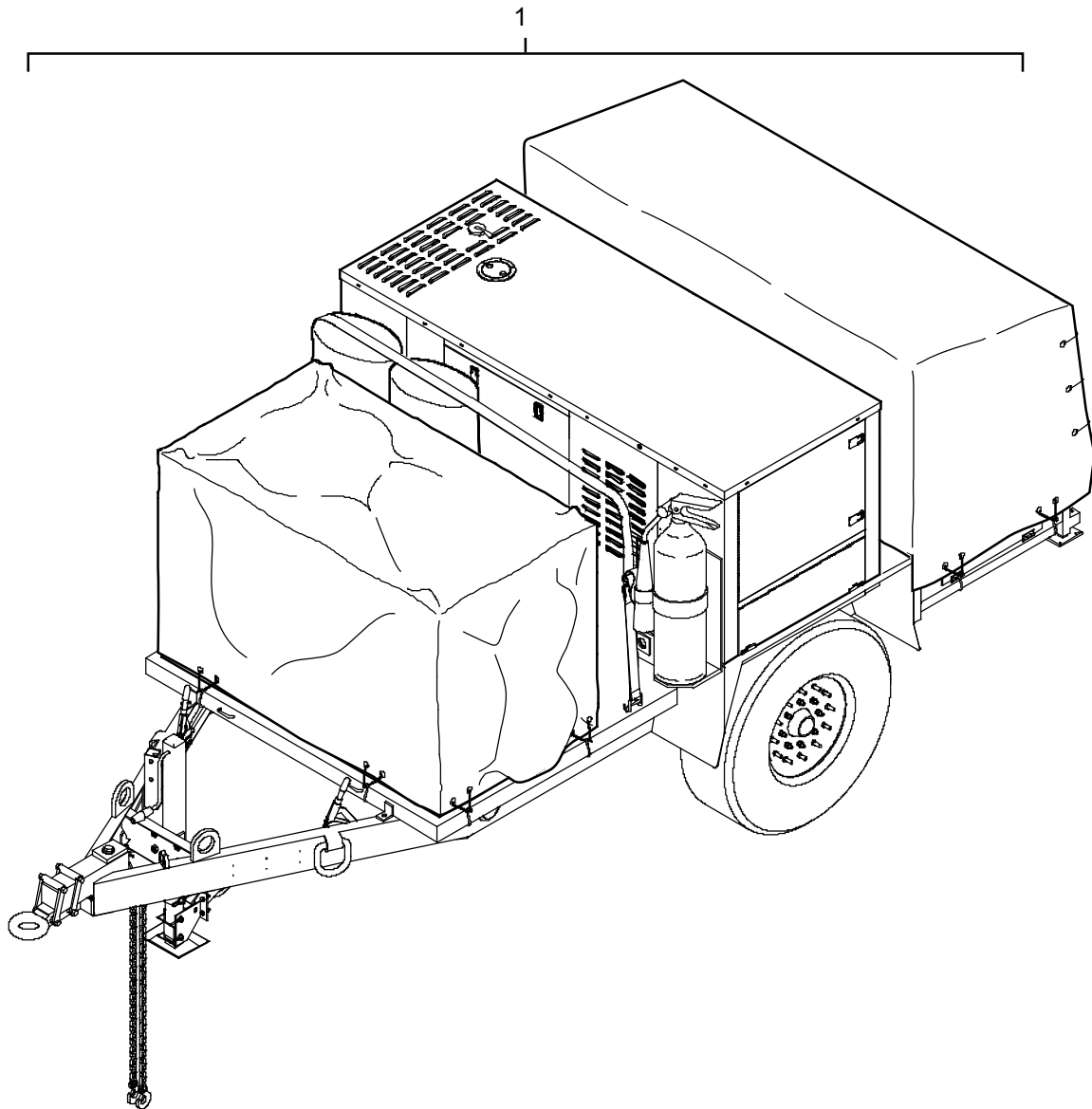


Figure 1. HP-2C/185 UST Trailer (Sheet 1 of 3).

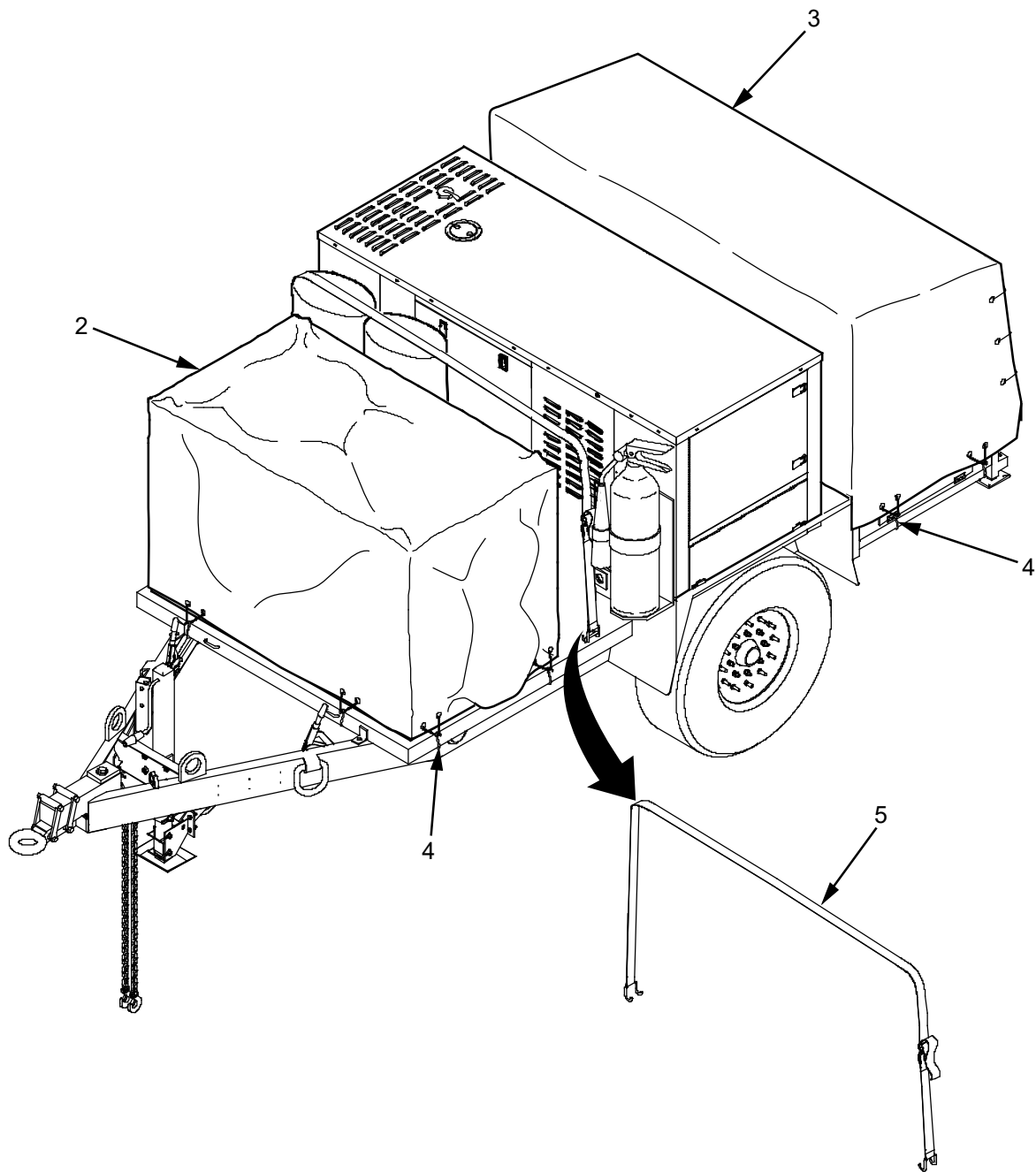


Figure 1. HP-2C/185 UST Trailer (Sheet 2 of 3).

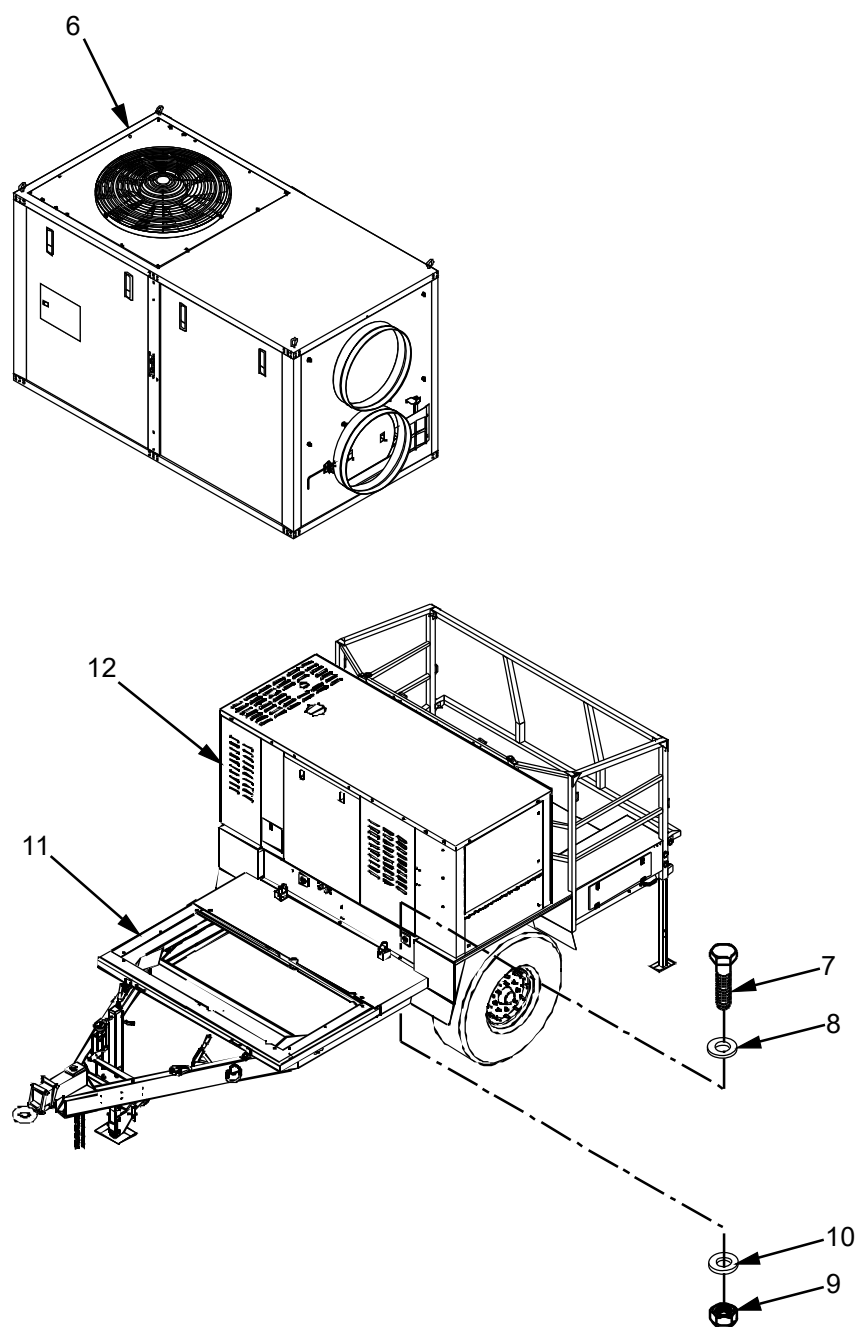


Figure 1. HP-2C/185 UST Trailer (Sheet 3 of 3).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION	(7) QTY.
FIGURE 1. HP-2C/185 UST TRAILER						
1			7KXX1	T2-80155G	DRASH HP-2C UTILITY SERVICE TRAILER, GREEN	1
1			7KXX1	T2-80155T	DRASH HP-2C UTILITY SERVICE TRAILER, TAN.....	1
2	PAOZZ	2540-01-558-8455	7JYX1	SH535-0007G	TARPAULIN.....	1
2	PAOZZ	2540-01-558-7518	7JYX1	SH535-0007T	COVER, FITTED, VEHICULAR BODY	1
3	PAOZZ		7JYX1	SH535-0008G	TARPAULIN.....	1
3	PAOZZ	2540-01-558-8554	7JYX1	SH535-0008T	TARPAULIN.....	1
5	PAOZZ	5340-01-554-2739	7JYX1	C408115	EYE HOOK.....	14
5	PAOZZ	3990-01-552-8296	7JYX1	SH535-0006	TIE DOWN,CARGO,VEHICLE ..	1
6	XBODD		7JYX1	T256250G	AIR CONDITIONER (SEE FIGURE 2 FOR BREAKDOWN)	1
6	XBODD		7JYX1	T256250T	AIR CONDITIONER (SEE FIGURE 2 FOR BREAKDOWN)	1
7	PAOZZ	5305-01-552-6246	7JYX1	T270746	SCREW,CAP,HEXAGON HEAD	10
8	PAOZZ	5310-01-554-1192	7JYX1	T270885	WASHER,FLAT	16
9	PAOZZ	5310-01-559-2446	7JYX1	T270760	NUT,SELF-LOCKING, HEXAGON	6
10	PAOZZ	5310-01-552-6251	7JYX1	T270790	WASHER,LOCK	4
11	XBDDD	2330-01-682-4648	7JYX1	T215125G	CHASSIS,TRAILER ASSEMBLY (SEE FIGURE 14 FOR BREAKDOWN).....	1
11	XBDDD	2330-01-681-6904	7JYX1	T215125T	CHASSIS,TRAILER ASSEMBLY (SEE FIGURE 14 FOR BREAKDOWN).....	1
12	XBFDD		7JYX1	T282271G	GENERATOR,DIESEL ENGINE (SEE FIGURE 5 FOR BREAKDOWN)	1
12	XBFDD		7JYX1	T282271T	GENERATOR,DIESEL ENGINE (SEE FIGURE 5 FOR BREAKDOWN)	1
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
ECU ENCLOSURE ASSEMBLY, 5T, T256250G GREEN, T256250T TAN

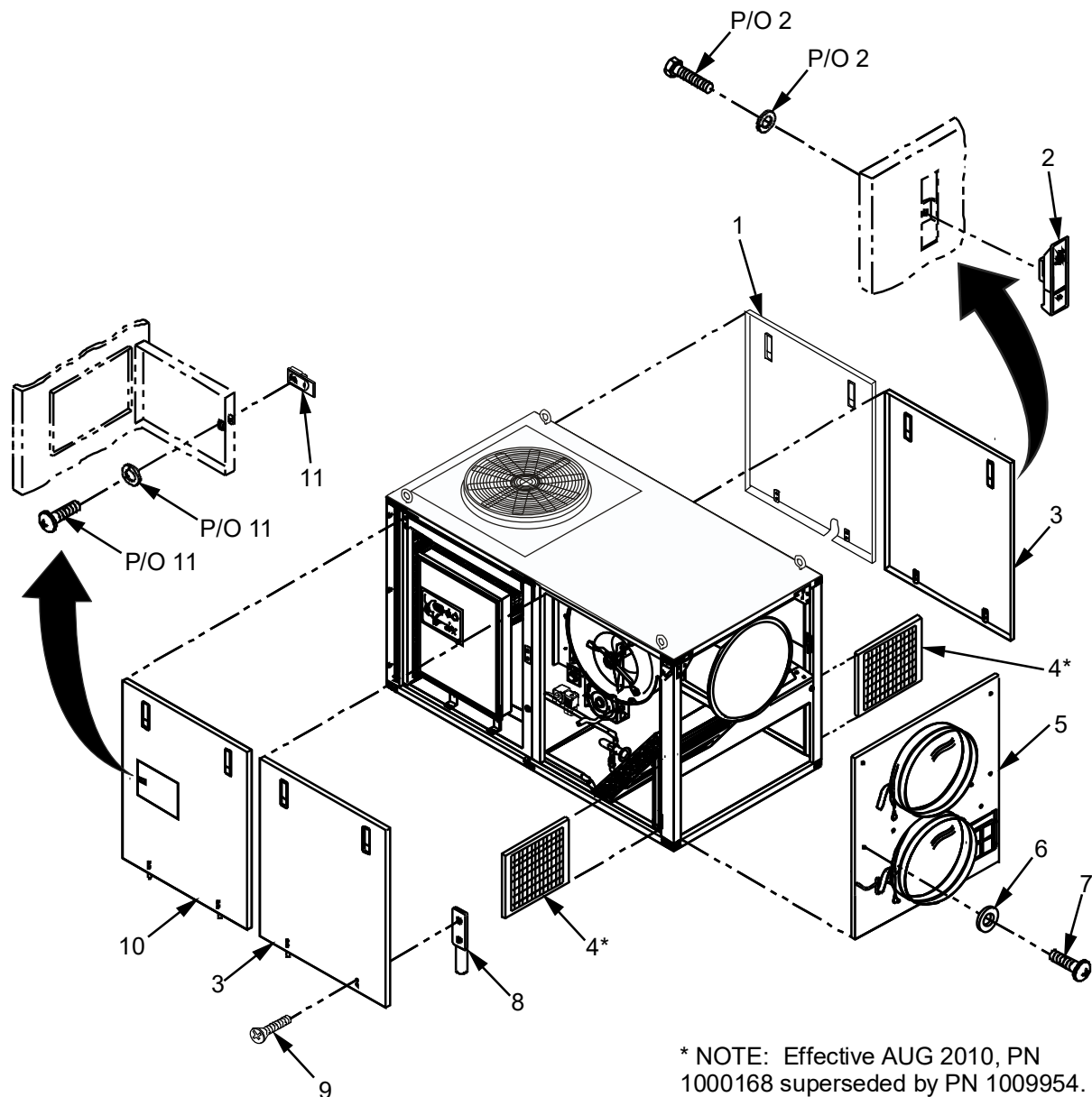


Figure 2. ECU ENCLOSURE ASSEMBLY, 5T, T256250G GREEN, T256250T TAN, (Sheet 1 of 2).

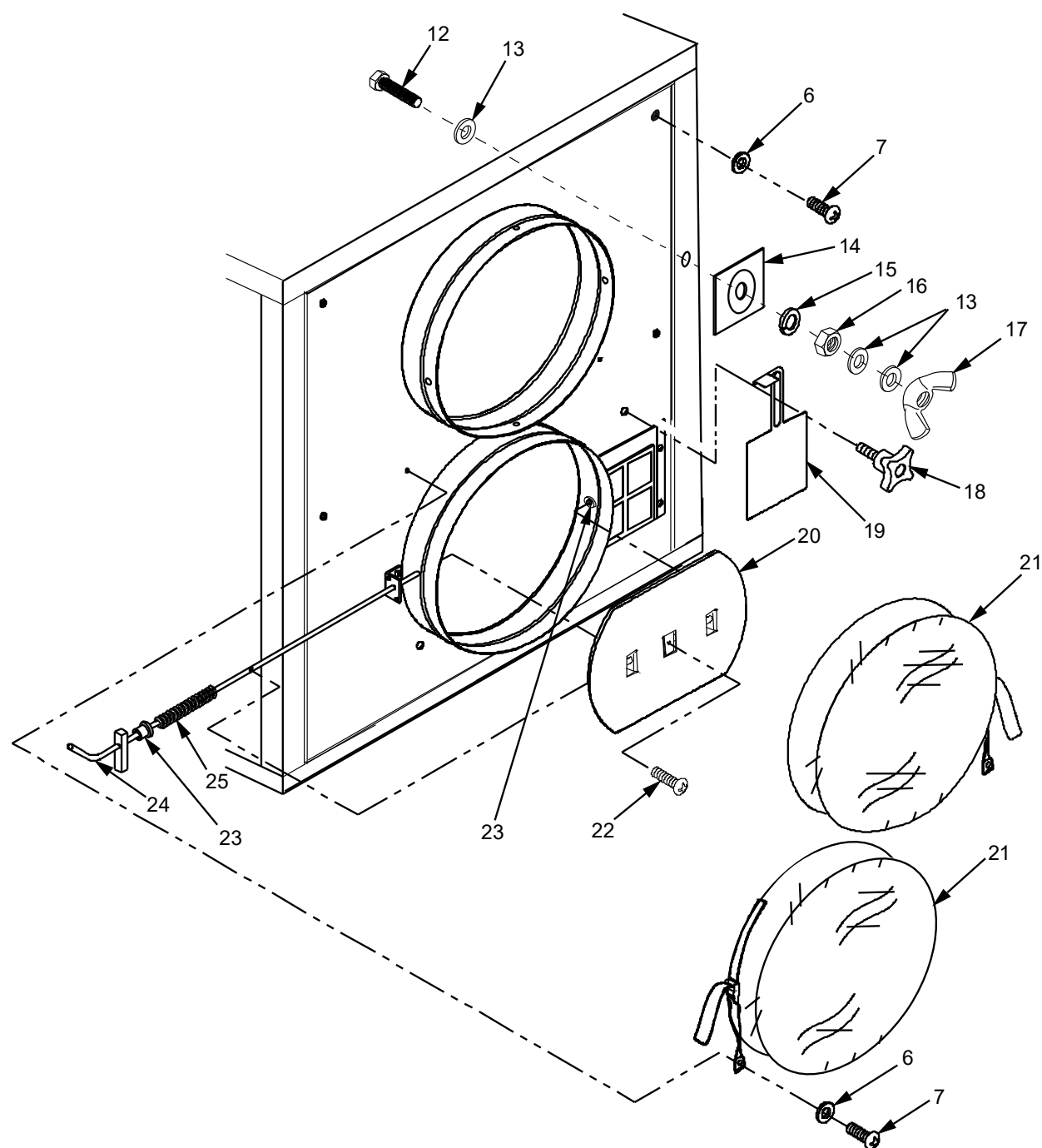


Figure 2. ECU Enclosure Assembly, 5T, T256250G Green, T256250T Tan, (Sheet 2 of 2).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 01						
FIGURE 2. ECU ENCLOSURE ASSEMBLY, 5T, T256250G GREEN, T256250T TAN						
1	XBFZZ		7JYX1	1002764	PANEL,ASSEMBLY,(POWER CABLE ACCESS),GREEN.....	1
1	XBFZZ		7JYX1	1002757	PANEL,ASSEMBLY,(POWER CABLE ACCESS),TAN	1
2	PAFZZ	5340-01-468-1309	7JYX1	T250856	CATCH,CLAMPING	8
3	XBFZZ		7JYX1	1002765	PANEL,ACCESS,EVAPORATOR FRONT/REAR GREEN	2
3	XBFZZ		7JYX1	1002758	PANEL,ACCESS,EVAPORATOR FRONT/REAR TAN.....	2
4*	PAFZZ	2940-01-606-3155	7JYX1	1009954	FILTER,ELEMENT,RETURN	2
5	XBFZZ		7JYX1	1002761	PANEL,ASSY,EVAPORATOR GREEN	1
5	XBFZZ		7JYX1	1002754	PANEL,ASSY,EVAPORATOR TAN	1
6	PAFZZ		7JYX1	HW903-6015	WASHER,FLAT	6
7	PAFZZ	5305-01-552-8706	7JYX1	1005002	SCREW,MACHINE.....	6
8	PAFZZ	5315-01-552-8316	7JYX1	PECU08T52	PIN, RETAINING	8
9	PAFZZ	5305-00-959-4158	7JYX1	1003101	SCREW,MACHINE.....	16
10	XBFZZ		7JYX1	1002763	PANEL,ACCESS,ELECTRICAL ENCLOSURE,GREEN	1
10	XBFZZ		7JYX1	1002756	PANEL,ACCESS,ELECTRICAL ENCLOSURE,TAN.....	1
11	PAFZZ	5340-01-552-0719	7JYX1	TG403-4003	CATCH,FLUSH	1
12	PAFZZ	5305-01-569-5822	7JYX1	T270545	SCREW,CAP,HEXAGON HEAD..	1
13	PAFZZ	5310-01-569-5414	7JYX1	T270585	WASHER,FLAT	3
14	XBFZZ		7JYX1	1004950	PLACARD,ADHESIVE	1
15	PAFZZ	5310-01-563-2566	7JYX1	T270595	WASHER,LOCK	1
16	PAFZZ	5310-01-485-7896	7JYX1	T270555	NUT,PLAIN,HEXAGON.....	1
17	PAFZZ	5310-01-533-2915	7JYX1	T270570	NUT,PLAIN,WING	1
18	PAFZZ	5355-01-552-3328	7JYX1	TG903-3402	KNOB,4-PRONG,BLACK	1
19	XBFZZ		7JYX1	TG423-0451-2	DOOR,SLIDING,FRESH AIR, GREEN	1
19	XBFZZ		7JYX1	1006024	DOOR,SLIDING,FRESH AIR,TAN	1
20	XBFZZ		7JYX1	TG423-0501-1	PLATE,DAMPER,GREEN	1
20	XBFZZ		7JYX1	1006026	PLATE,DAMPER,TAN.....	1
21	PAFZZ	5340-01-552-7835	7JYX1	T295161BK	DUCT COVER, BLACK.....	2
		5340-01-558-6141				

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
22	PAFZZ	5305-01-568-3945	7JYX1	1000898	SCREW,MACHINE	1
23	PAFZZ	3120-01-580-5747	7JYX1	1003193	BEARING,FLANGED,PLAIN, PLASTIC	2
24	XBFZZ		7JYX1	TG423-0551-1	ROD,DAMPER,REGULATOR, GREEN.....	1
24	XBFZZ		7JYX1	1006025	ROD,DAMPER,REGULATOR, TAN	1
25	PAFZZ		7JYX1	TG903-4067	SPRING,COMPRESSION	1
END OF FIGURE						

**PARTS INFORMATION
HP-2C/185 UST Trailer
ECU SUB-ASSEMBLIES**

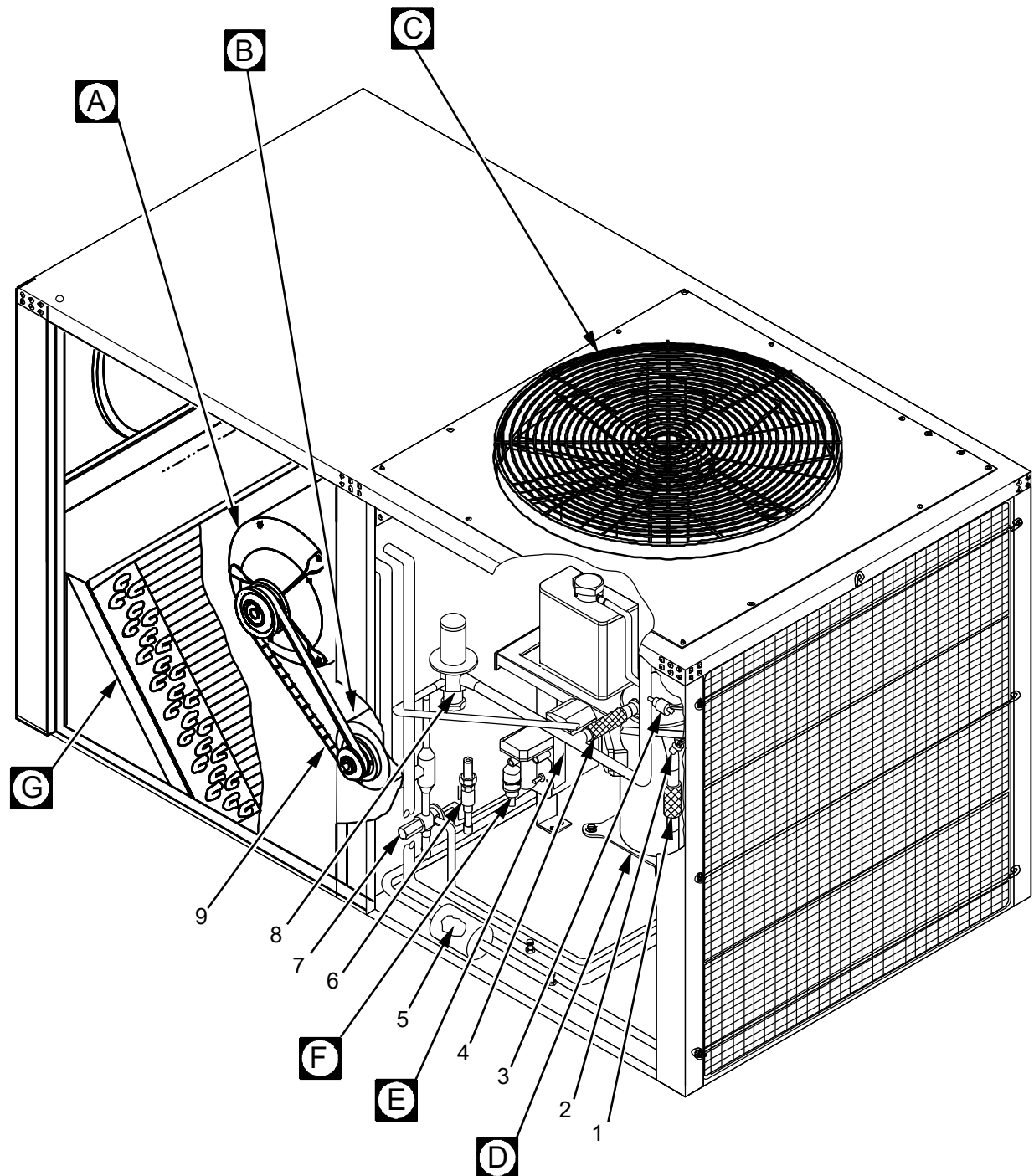
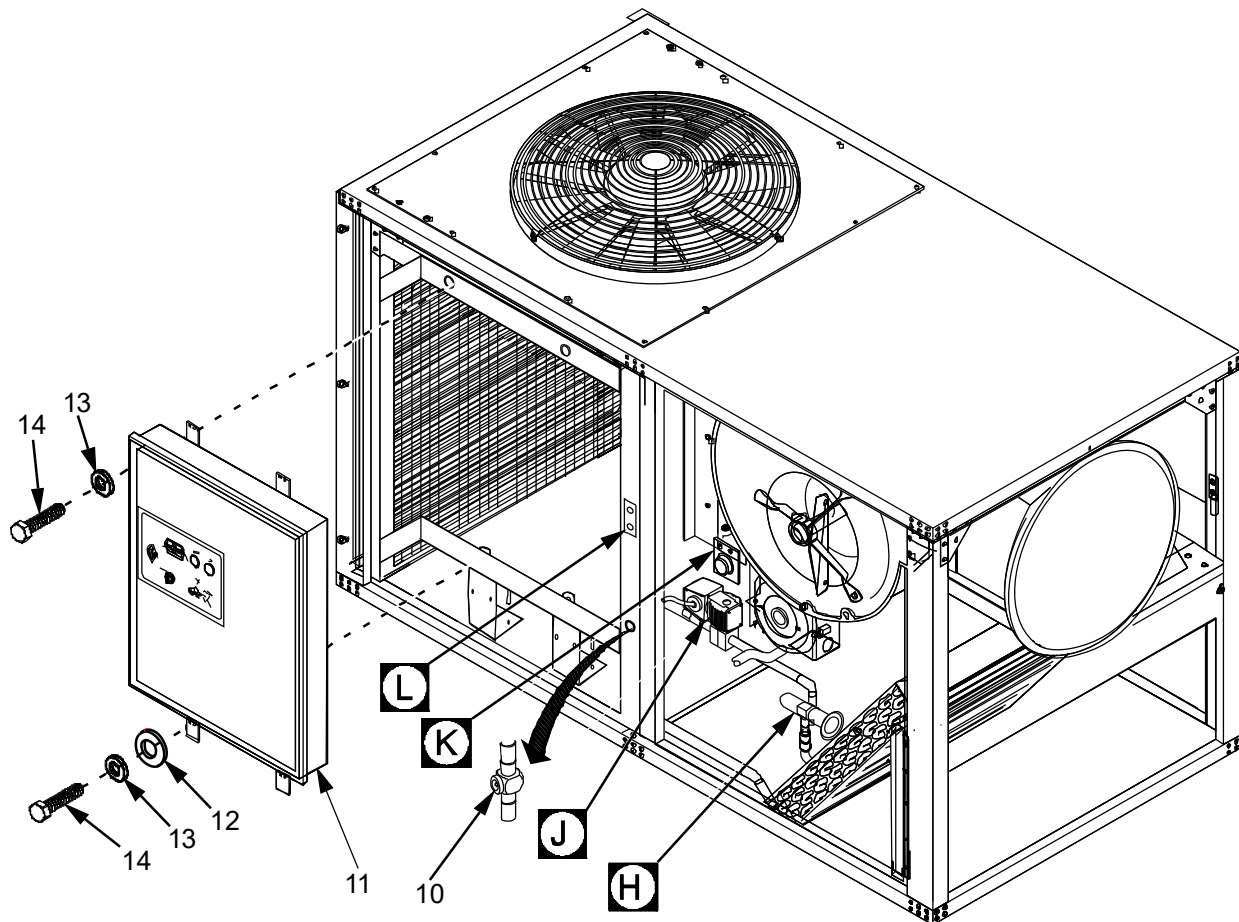


Figure 3. 5T ECU Sub-Assemblies, (Sheet 1 of 11).



NOTE: Detail "I" not used.

Figure 3. 5T ECU Sub-Assemblies, (Sheet 2 of 11).

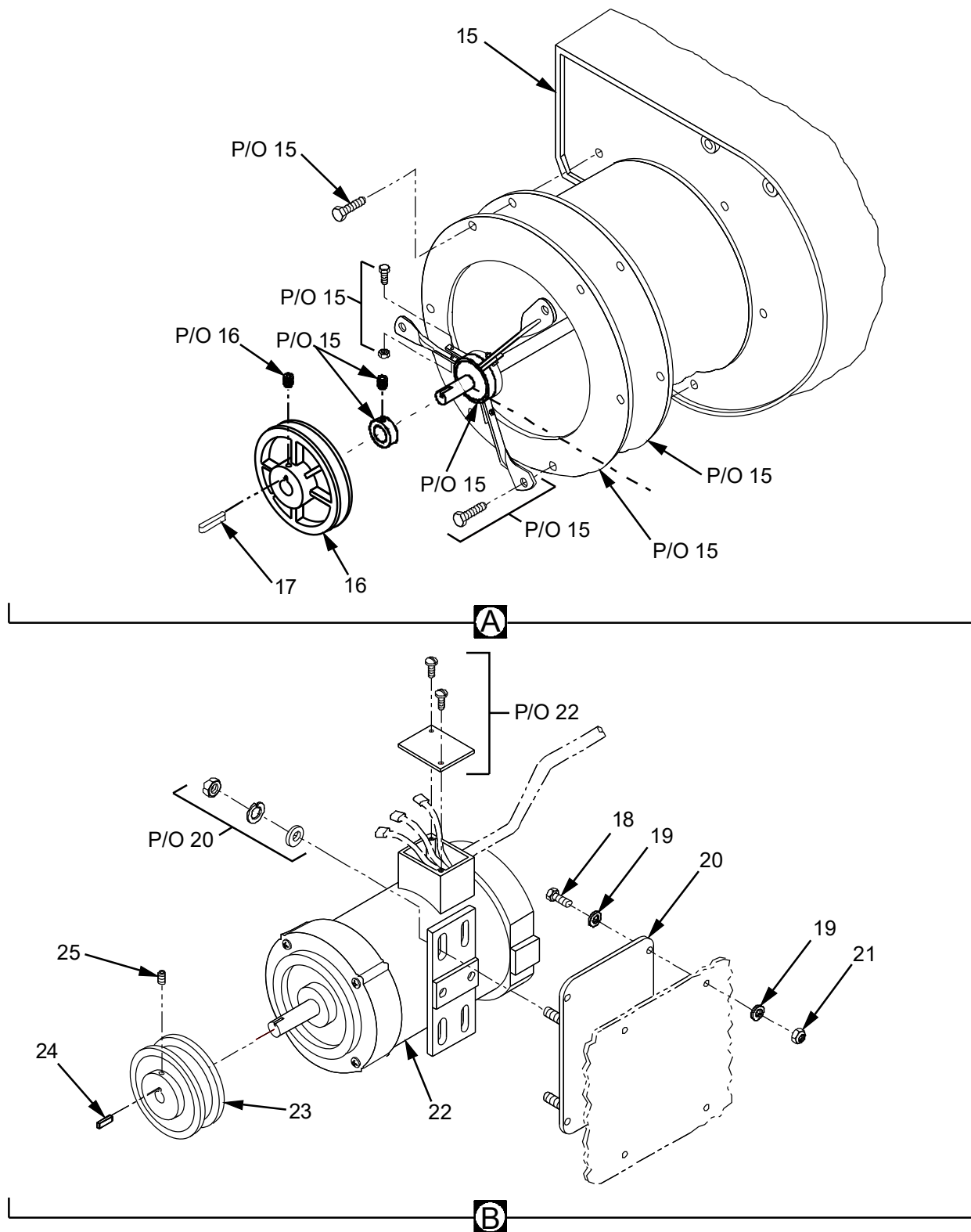


Figure 3. 5T ECU Sub-Assemblies, (Sheet 3 of 11).

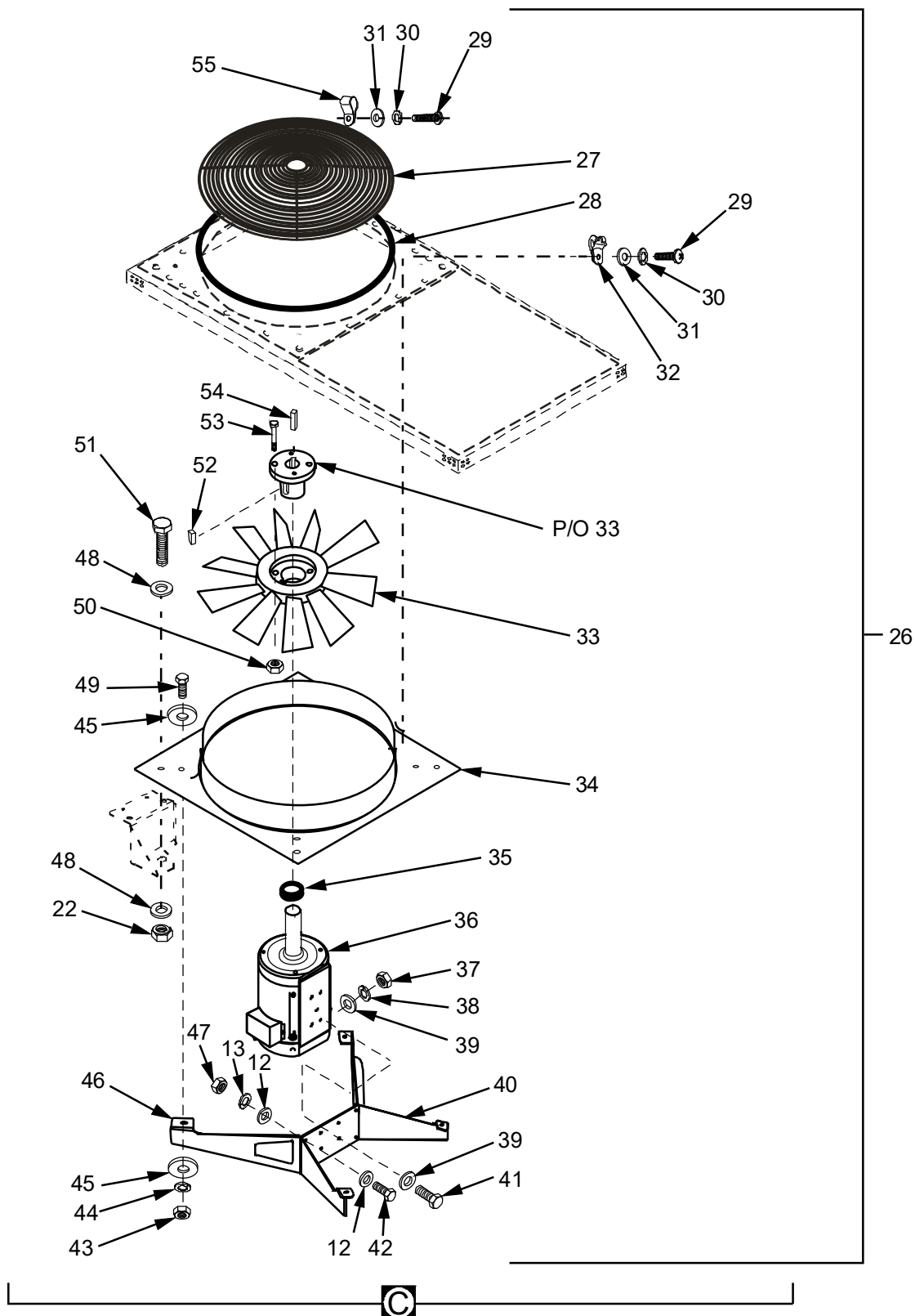


Figure 3. 5T ECU Sub-Assemblies, (Sheet 4 of 11).

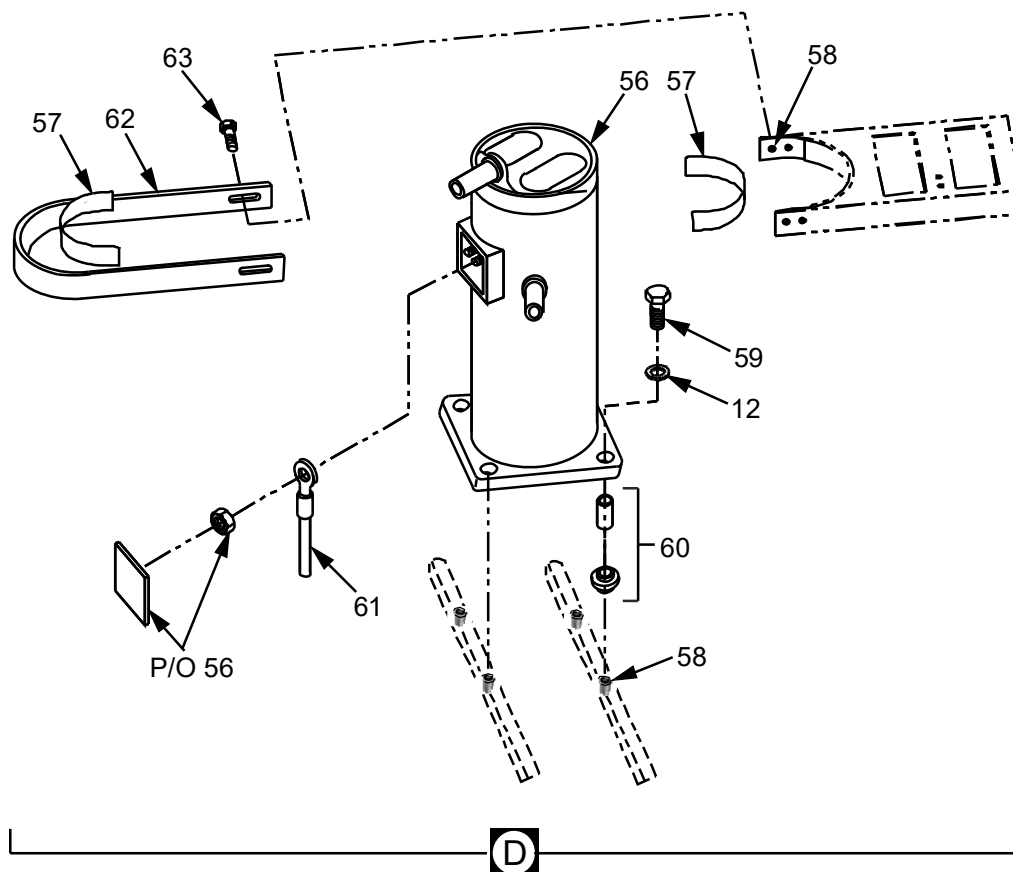


Figure 3. 5T ECU Sub-Assemblies, (Sheet 5 of 11).

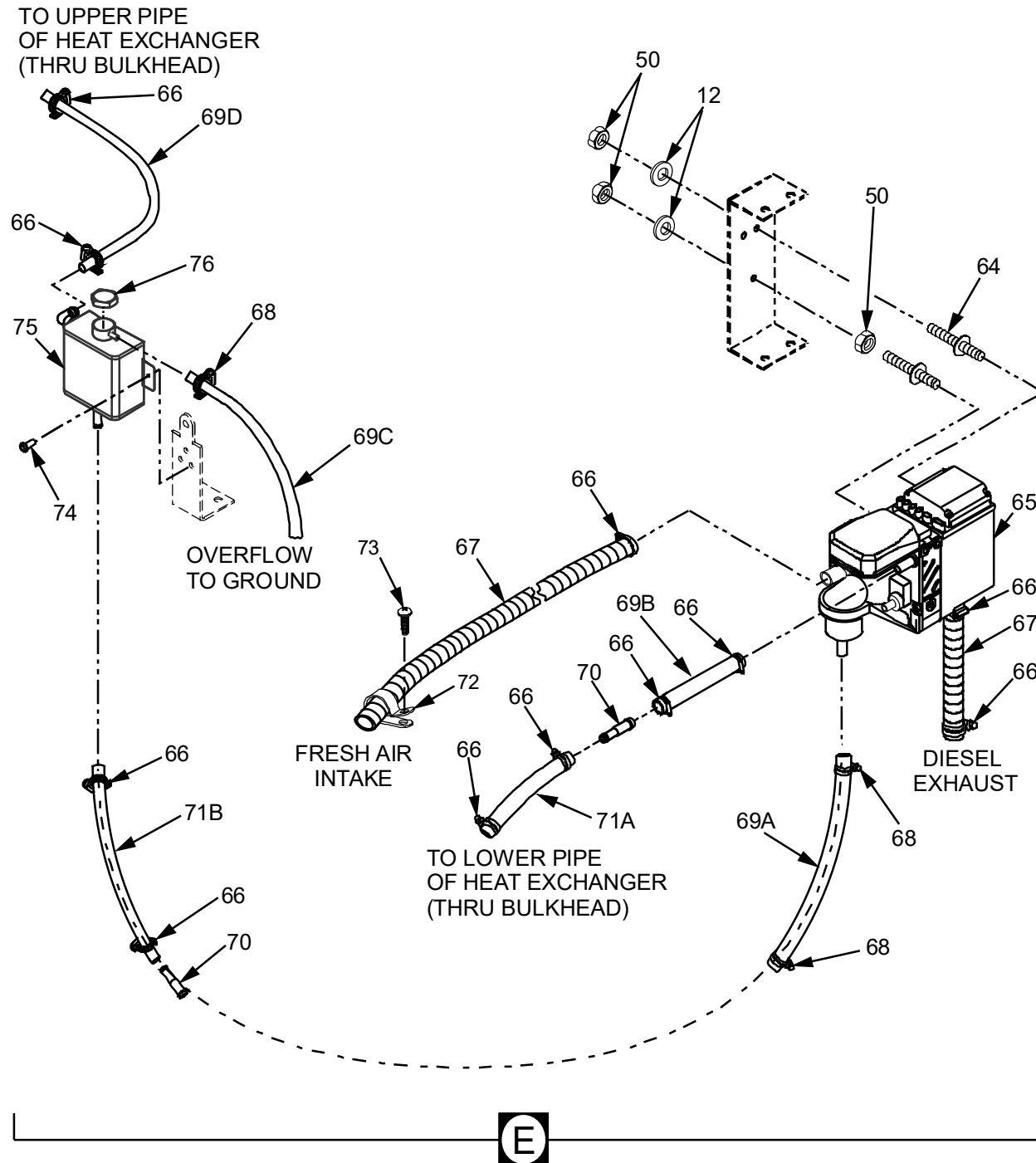


Figure 3. 5T ECU Sub-Assemblies, (Sheet 6 of 11).

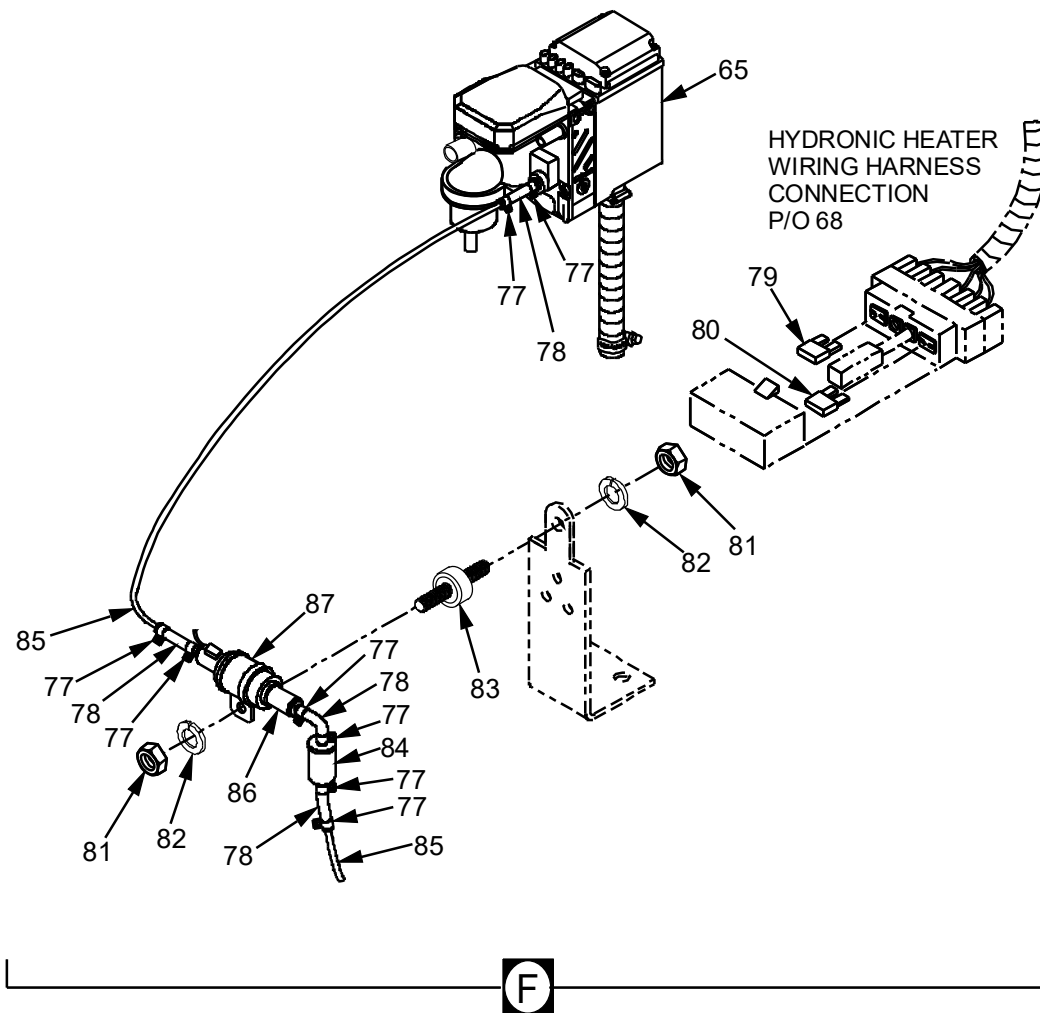


Figure 3. 5T ECU Sub-Assemblies, (Sheet 7 of 11).

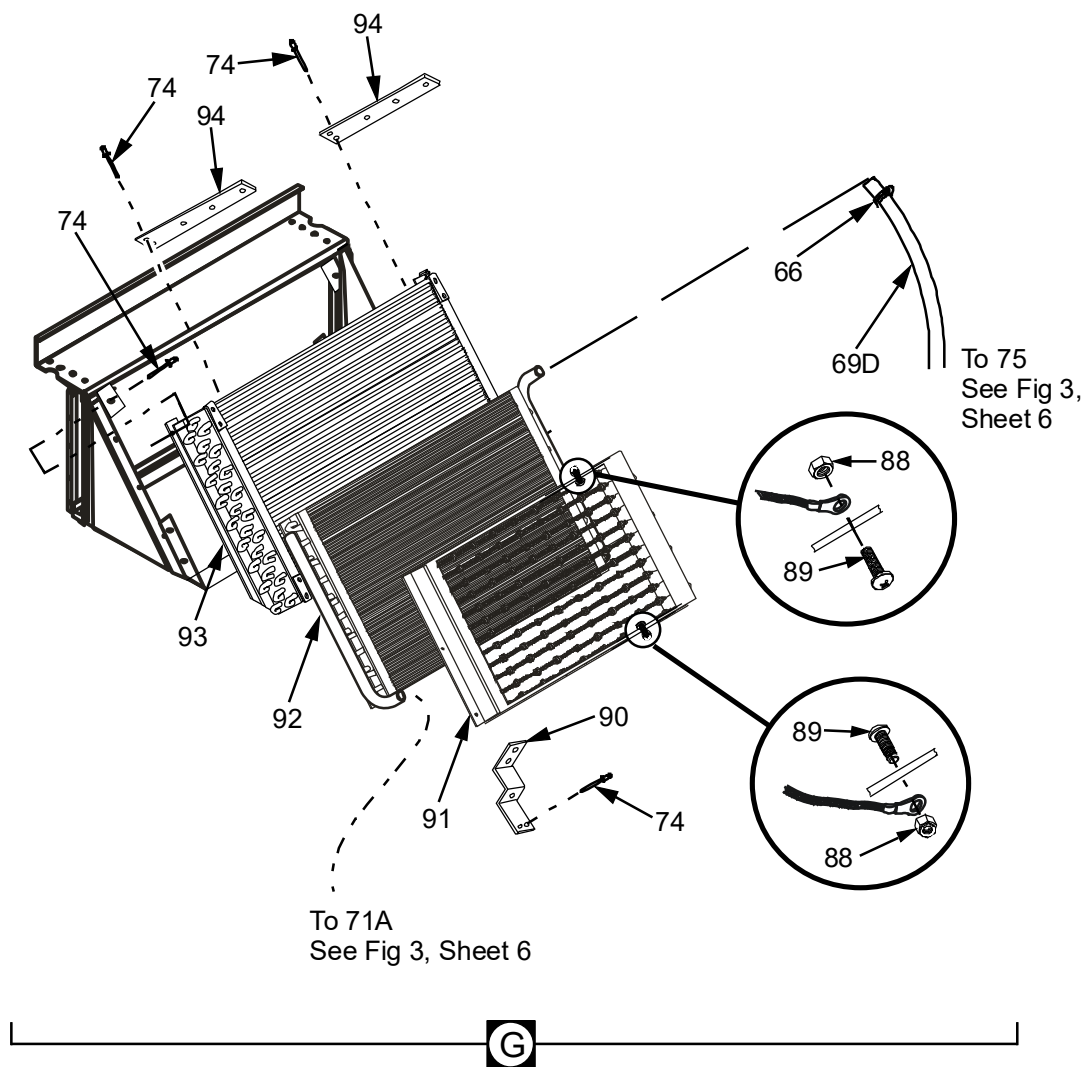


Figure 3. 5T ECU Sub-Assemblies, (Sheet 8 of 11).

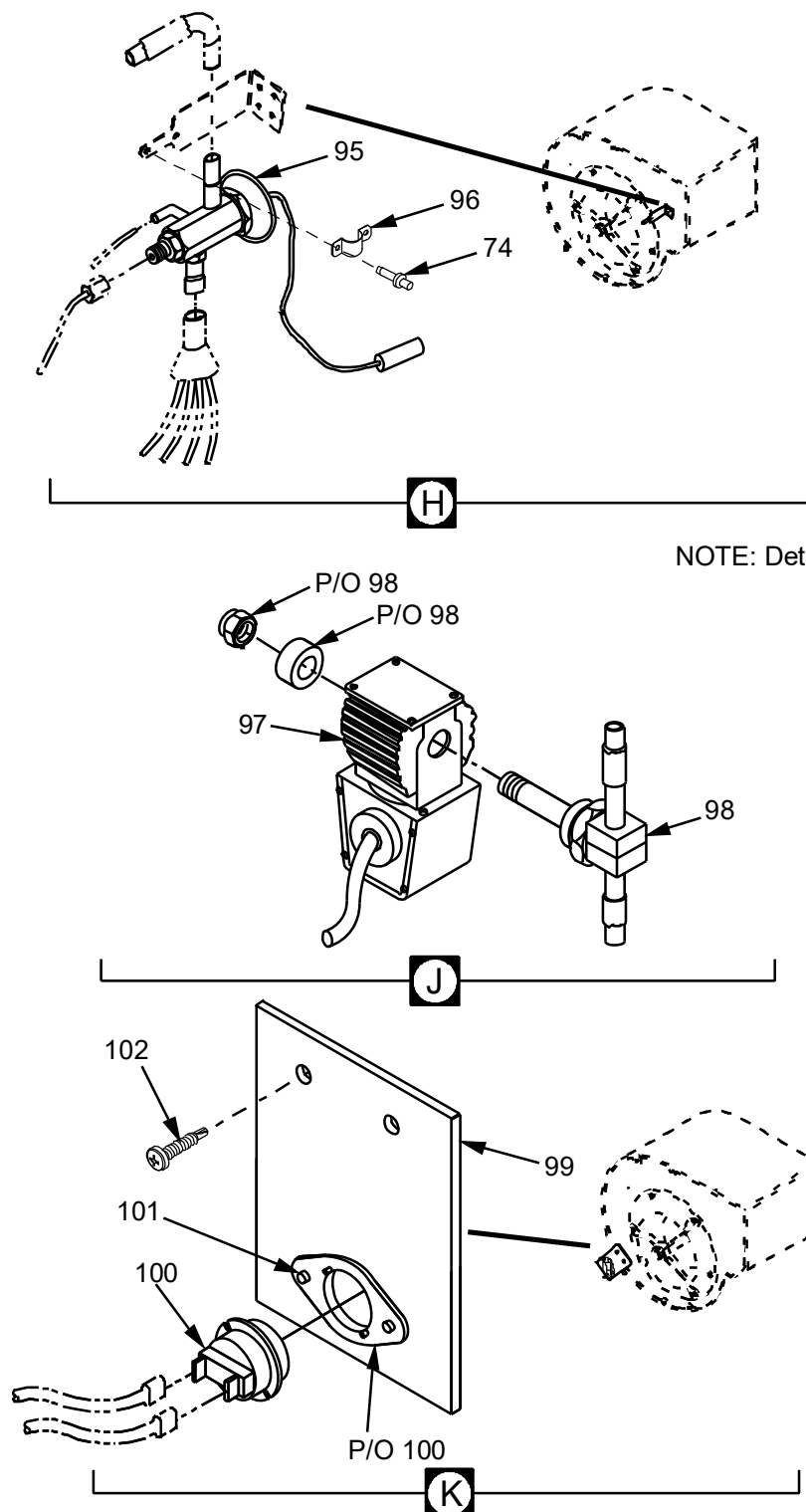


Figure 3. 5T ECU Sub-Assemblies, (Sheet 9 of 11).

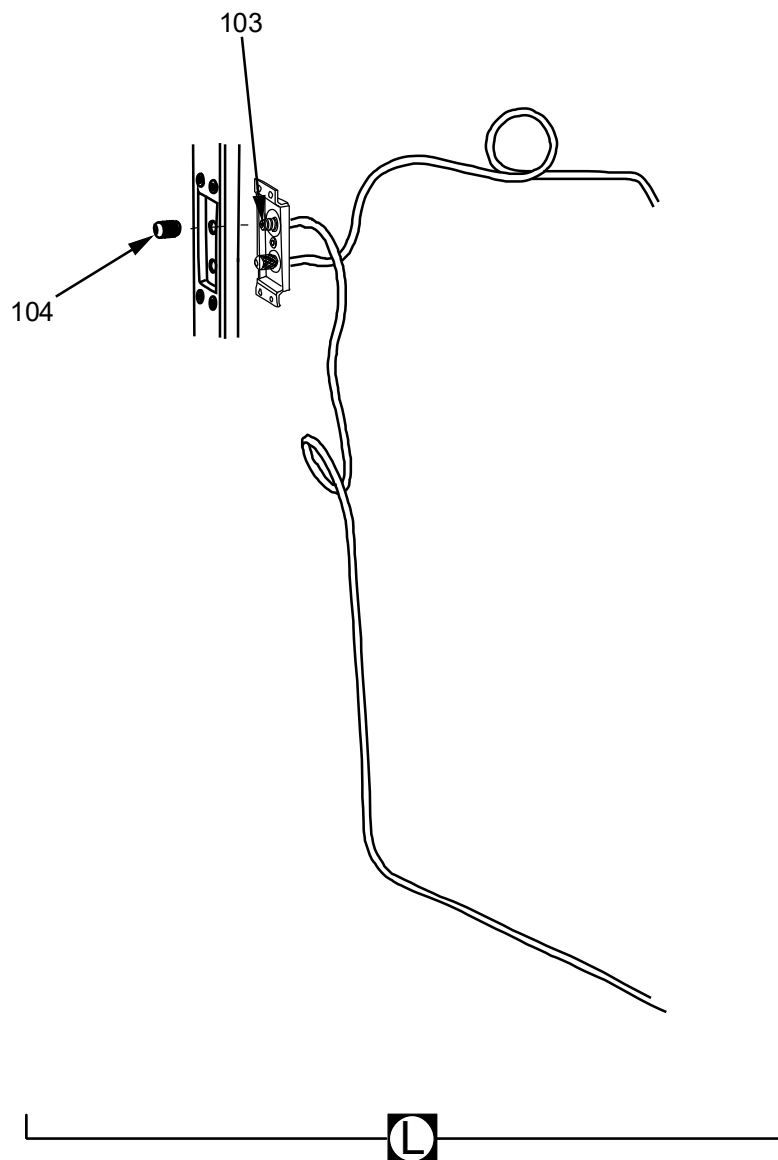


Figure 3. 5T ECU Sub-Assemblies, (Sheet 10 of 11).

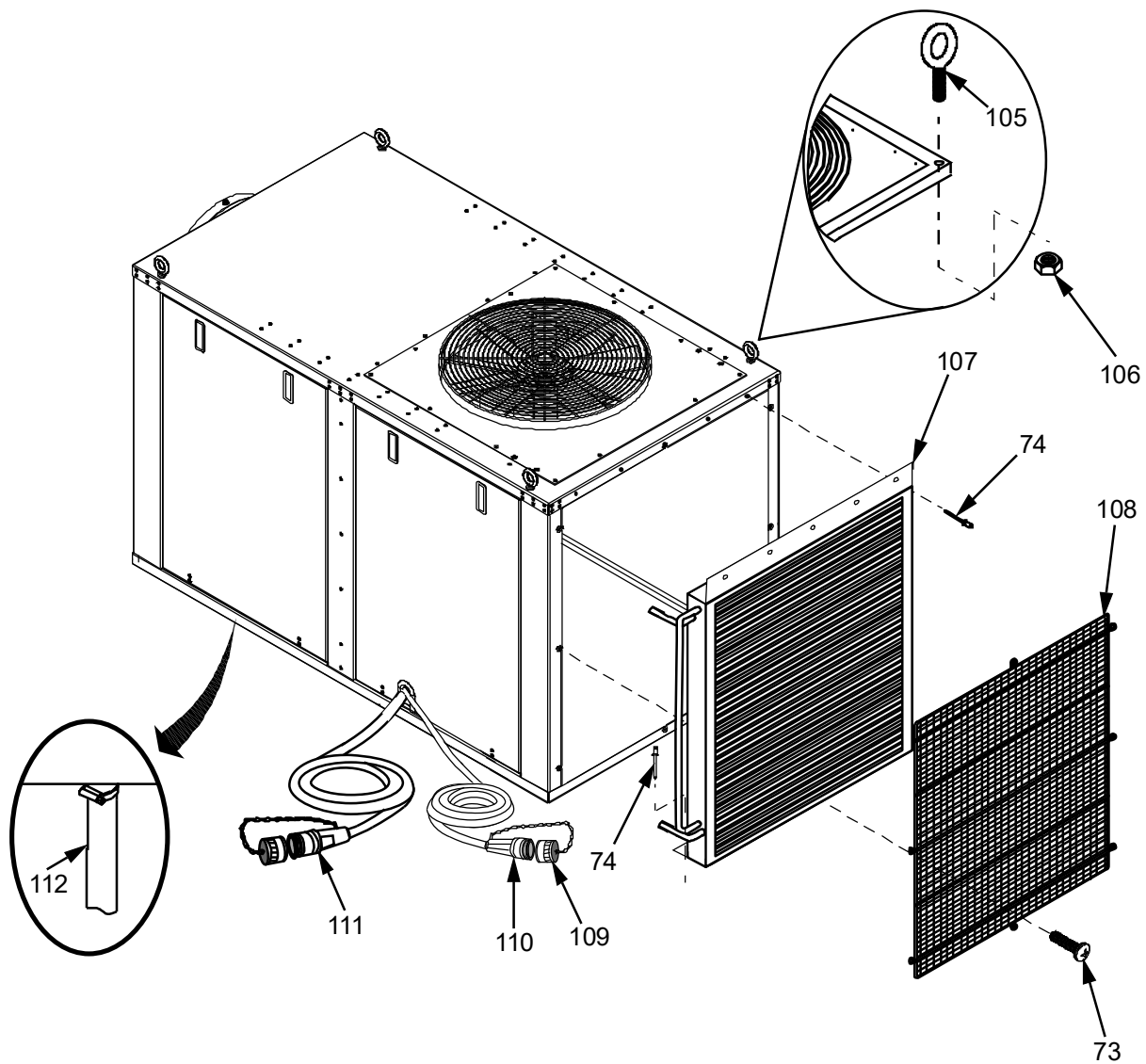


Figure 3. 5T ECU Sub-Assemblies, (Sheet 11 of 11).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 0101						
FIGURE 3. 5T ECU SUB-ASSEMBLIES						
1	PAFZZ	5340-01-568-7761	7JYX1	TG903-4057	MOUNT,RESILENT, GENERAL PURPOSE	1
2	PAFZZ	5930-01-568-7581	7JYX1	TG903-5501	SWITCH,PRESSURE,LOW.....	1
3	PAFZZ	5930-01-569-5592	7JYX1	TG903-4092	SWITCH,PRESSURE,HIGH.....	1
4	PAFZZ	5340-01-569-2970	7JYX1	TG903-4056	MOUNT,RESILENT, GENERAL PURPOSE	1
5	PAFZZ	4130-01-903-8372	7JYX1	TG903-6505	FILTER,DRIER	1
6	PAFZZ	4820-01-333-6042	7JYX1	1000928	VALVE,RELIEF,HIGH PRESSURE	1
7	PAFZZ	3835-01-568-7074	7JYX1	1000019	VALVE,QUENCH.....	1
8	PAFZZ	4820-01-165-7825	7JYX1	1000930	VALVE,EXPANSION	1
9	PAFZZ	3030-00-869-3419	7JYX1	T10044P	BELT,V.....	1
10	PAFZZ	6680-00-778-3914	7JYX1	TG903-4066	SIGHT GLASS	1
11	XBFZZ		7JYX1	1011684	SUB-ASSEMBLY, ELECTRICAL PANEL COMPLETE,W/HEAT, W/LOADSHED,(SEE FIGURE 4 FOR BREAKDOWN)	1
12	PAFZZ		7JYX1	T270380	WASHER,FLAT	17
13	PAFZZ	5310-01-595-6593	7JYX1	T270390	WASHER,SPLIT,LOCK	4
14	PAFZZ	5305-01-602-4154	7JYX1	T270339	SCREW,CAP,HEXAGON HEAD ..	4
15	XBFZZ		7JYX1	1000926	BLOWER ASSEMBLY	1
16	XBFZZ	3020-01-099-6277	7JYX1	TG903-4002	SHEAVE,PULLEY	1
17	PAFZZ		7JYX1	1002562	KEY,MACHINED	1
18	PAFZZ	5306-01-552-9111	7JYX1	T270544	SCREW,CAP,HEXAGON HEAD ..	4
19	PAFZZ	5310-01-522-8619	7JYX1	T270884	WASHER,FLAT	8
20	XBFZZ		7JYX1	1000918	BASE,MOUNT,EVAP MOTOR.....	1
21	PAFZZ	5310-01-479-5890	7JYX1	T270560	NUT,SELF-LOCKING	8
22	PAFZZ	6105-01-553-1609	7JYX1	TG903-5001	MOTOR,EVAPORATOR	1
23	XBFZZ		7JYX1	1001031	PULLEY,EVAP MOTOR.....	1
24	PAFZZ		7JYX1	1002561	KEY,MACHINE	1
25	PAFZZ	5305-01-569-6914	7JYX1	1001035	SETSCREW,ALLEN HEAD	1
26	XBFZZ		7JYX1	TG903-4071	CONDENSER FAN ASSEMBLY ..	1
27	XBFZZ		7JYX1	1001037	GRILL,CONDENSER FAN, GREEN	1
27	XBFZZ		7JYX1	1009962	GRILL,CONDENSER FAN,TAN ...	1
28	PAFZZ		7JYX1	1004991	SEAL,TRIMLOCK	1
29	PAFZZ	5305-01-564-6941	7JYX1	HW903-3021	SCREW,MACHINE	4
30	PAFZZ		7JYX1	1000319	WASHER,LOCK	4
31	PAFZZ		7JYX1	1000318	WASHER,FLAT	4

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
32	PAFZZ	5340-01-540-6541	7JYX1	TG903-4089	CLAMP,LOOP,W/VINYL COATING	3
33	XBFZZ		7JYX1	TG903-4090	FAN,CONDENSER,W/HUB.....	1
34	XBFZZ		7JYX1	1001038	SHROUD,CONDENSER FAN	1
35	PAFZZ		7JYX1	1006013	SEAL,SHAFT,V-RING	1
36	PAFZZ	6105-01-568-7464	7JYX1	TG903-4087	MOTOR, CONDENSER	1
37	PAFZZ	5310-01-583-0331	7JYX1	1000460	NUT,SELF-LOCKING,HEXAGON	4
38	PAFZZ	5310-01-552-3975	7JYX1	T270490	WASHER,LOCK	4
39	PAFZZ	5310-01-552-4510	7JYX1	T270480	WASHER,FLAT	4
40	XBFZZ		7JYX1	1001036	BRACKET,H,RIGHT SIDE.....	1
41	PAFZZ	5305-01-568-9387	7JYX1	T270440	SCREW,CAP,HEXAGON HEAD ..	4
42	PAFZZ	5306-01-535-6495	7JYX1	T270340	SCREW,CAP,HEXAGON HEAD ..	4
43	PAFZZ	5310-01-559-2446	7JYX1	T270760	NUT,SELF-LOCKING,HEXAGON	4
44	PAFZZ	5310-01-552-6251	7JYX1	T270790	WASHER,LOCK	4
45	PAFZZ	5310-01-558-7720	7JYX1	T270780	WASHER,FLAT	4
46	XBFZZ		7JYX1	1001476	BRACKET,H,LEFT SIDE	1
47	PAFZZ	5310-01-230-7016	7JYX1	1002550	NUT,SELF-LOCKING,HEXAGON	4
48	PAFZZ	5310-01-503-8765	7JYX1	T270580	WASHER,FLAT	8
49	PAFZZ	5306-01-558-7187	7JYX1	T270745	SCREW,CAP,HEXAGON HEAD ..	4
50	PAFZZ	5310-01-602-4140	7JYX1	1005375	NUT,SELF-LOCKING,HEXAGON	8
51	PAFZZ	5305-01-552-6254	7JYX1	T270544	SCREW,CAP,HEXAGON HEAD ..	4
52	PAFZZ		7JYX1	1006041	KEY STOCK	1
53	PAFZZ	5305-01-559-2700	7JYX1	T270343	SCREW,CAP,HEXAGON HEAD ..	4
54	PAFZZ		7JYX1	1005075	KEY STOCK	1
55	PAFZZ		7JYX1	1005077	CLAMP,EMI	1
56	PAFZZ		7JYX1	TG903-4016	COMPRESSOR.....	1
57	XBFZZ		7JYX1	1006061	INSULATOR,CLOSED CELL,SELF-ADHESIVE.....	1
58	PAFZZ	3510-01-499-2692	7JYX1	T270370	NUT,RIVET	8
59	PAFZZ	5305-01-569-1152	7JYX1	1000921	SCREW,CAP,HEXAGON HEAD ..	4
60	PAFZZ	5340-01-581-1605	7JYX1	TG903-4055	VIBRATION ABSORBER KIT	4
61	XBFZZ		7JYX1	1009810	HARNESS,WIRE,COMPRESSOR...	1
62	XBFZZ		7JYX1	TG903-4053	STRAP,COMPRESSOR.....	1
63	PAFZZ		7JYX1	HW903-4015	SCREW,CAP,HEXAGON HEAD ..	4
64	PAFZZ	5307-01-558-7259	7JYX1	TG903-4606	STUD,MOUNTING.....	3
65	PAFZZ	2990-01-552-6325	7JYX1	TG903-5003	AUXILIARY HEATER	1
66	PAFZZ	4730-01-492-6678	7JYX1	1000904	CLAMP.....	11
67	PAFZZ	4210-01-568-9442	7JYX1	TG903-3601	HOSE,METALIC	2
68	PAFZZ	4730-01-556-5477	7JYX1	TG903-4626	CLAMP,HOSE	3
69	PAFZZ		7JYX1	T230055	HOSE,NONMETALIC	4
69A	PAFZZ		7JYX1	6" LONG	CIRCULATING PUMP TO COOLANT TANK	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
69B	PAFZZ		7JYX1	8.5" LONG	AUXILIARY HEATER TO HEAT EXCHANGER	1
69C	PAFZZ		7JYX1	27.5" LONG	COOLANT TANK OVERFLOW	1
69D	PAFZZ		7JYX1	31.5" LONG	COOLANT TANK TO HEAT EXCHANGER	1
70	PAFZZ	4730-01-569-7756	7JYX1	1000924	REDUCER,COPPER	2
71	PAFZZ		7JYX1	T225965	HOSE,NONMETALIC	2
71A	PAFZZ		7JYX1	22.5" LONG	HEATING EXCHANGER TO AUXILIARY HEATER.....	1
71B	PAFZZ		7JYX1	14" LONG	COOLANT TANK TO CIRCULATING PUMP	1
72	PAFZZ		7JYX1	1013200	CLAMP	1
73	PAFZZ		7JYX1	1011683	SCREW,MACHINE	9
74	PAFZZ	5320-01-568-6990	7JYX1	1000937	RIVET,POP	37
75	XBFZZ		7JYX1	TG903-3301	TANK,COOLANT	1
76	PAFZZ	2930-01-569-1146	7JYX1	1000905	CAP,COOLANT	1
77	PAFZZ	4730-01-552-2772	7JYX1	TG903-4012	CLAMP	8
78	PAFZZ	4720-01-552-9960	7JYX1	TG903-6733	HOSE,CONNECTOR.....	4
79	PAFZZ	5920-01-414-6983	7JYX1	TG903-6602	FUSE,INCLOSED LINK,5A	1
80	PAFZZ	5920-01-414-6434	7JYX1	TG903-6603	FUSE,INCLOSED LINK,15A	1
81	PAFZZ	5310-01-572-6753	7JYX1	1000730	NUT,PLAIN HEXAGON	2
82	PAFZZ		7JYX1	1009986	WASHER,LOCK	2
83	PAFZZ		7JYX1	1011685	MOUNT,ANTI-VIBRATION.....	1
84	PAFZZ	2910-01-553-0046	7JYX1	TG903-6501	FILTER,IN-LINE.....	1
85	PAFZZ		7JYX1	TG903-6705	HOSE,NON-METALIC	2
86	PAFZZ	2910-01-553-0047	7JYX1	TG903-3002	PUMP,FUEL,HEATER.....	1
87	PAFZZ	4730-01-552-6415	7JYX1	TG903-4011	CLAMP,12MM.....	1
88	PAFZZ	5310-01-526-1750	7JYX1	1005080	NUT,HEXAGON,W/EXTERNAL TOOTH WASHER.....	2
89	PAFZZ	5305-01-538-8011	7JYX1	1005616	SCREW,MACHINE	2
90	XBFZZ		7JYX1	1001034	BRACKET,MOUNT,ELECTRIC HEATING ELEMENT	2
91	XBFZZ		7JYX1	1000922	ELEMENT,ELECTRIC HEATING .	1
92	XBFZZ		7JYX1	TG903-4007	HEAT EXCHANGER	1
93	XBFZZ		7JYX1	TG903-4006	COIL,EVAPORATOR	1
94	XBFZZ		7JYX1	1011686	BRACKET,MOUNTING, EVAPORATOR COIL.....	2
95	PAFZZ	4820-01-568-7079	7JYX1	1000929	VALVE,EXPANSION	1
96	PAFZZ		7JYX1	1007356	CLAMP,PIPE,COPPER	1
97	PAFZZ	9999-01-568-8609	7JYX1	1004486	COIL,SOLENOID,24V	1
98	PAFZZ	4810-01-568-7071	7JYX1	TG903-4093	VALVE,SOLENOID	1
99	XBFZZ		7JYX1	TG903-3501	BRACKET,MOUNT,HI-TEMP SWITCH	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
100	PAFZZ	5930-01-568-9799	7JYX1	1000947	SWITCH,HEATER,HI-TEMP CUTOFF	1
101	PAFZZ	5320-00-416-9253	7JYX1	1004966	RIVET,BLIND.....	2
102	PAFZZ		7JYX1	1005074	SCREW,SELF-TAPPING	2
103	PAFZZ		7JYX1	T30001C	SCHRADER VALVE & CAP	2
104	PAFZZ	4730-01-350-5452	7JYX1	1006039	REPLACEMENT CAP,SCHRADER VALVE	2
105	PAFZZ		7JYX1	1007428	EYEBOLT,LIFTING,GREEN.....	4
105	PAFZZ		7JYX1	1007429	EYEBOLT,LIFTING,TAN	4
106	PAFZZ	5310-01-584-0676	7JYX1	1001414	NUT,PLAIN,HEXAGON	4
107	XBFZZ		7JYX1	TG903-4004	COIL,CONDENSER.....	1
108	XBFZZ		7JYX1	1011687	GRILL,CONDENSER COIL, GREEN	1
108	XBFZZ		7JYX1	1006023	GRILL,CONDENSER COIL,TAN..	1
109	PAFZZ		7JYX1	1014281	CORD,DUST CAP,W/CHAIN	1
110	XBFZZ		7JYX1	1014280	CABLE ASSY,5T GENERATOR POWER.....	1
111	XBFZZ		7JYX1	1014279	CABLE ASSY, POWER, 60A, SHIELDED (INCL CONNECTOR)	1
112	PAFZZ		7JYX1	PECU9010	DRAIN,KAZOO	2
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
ECU ELECTRICAL CONTROL PANEL ASSEMBLY DETAILS

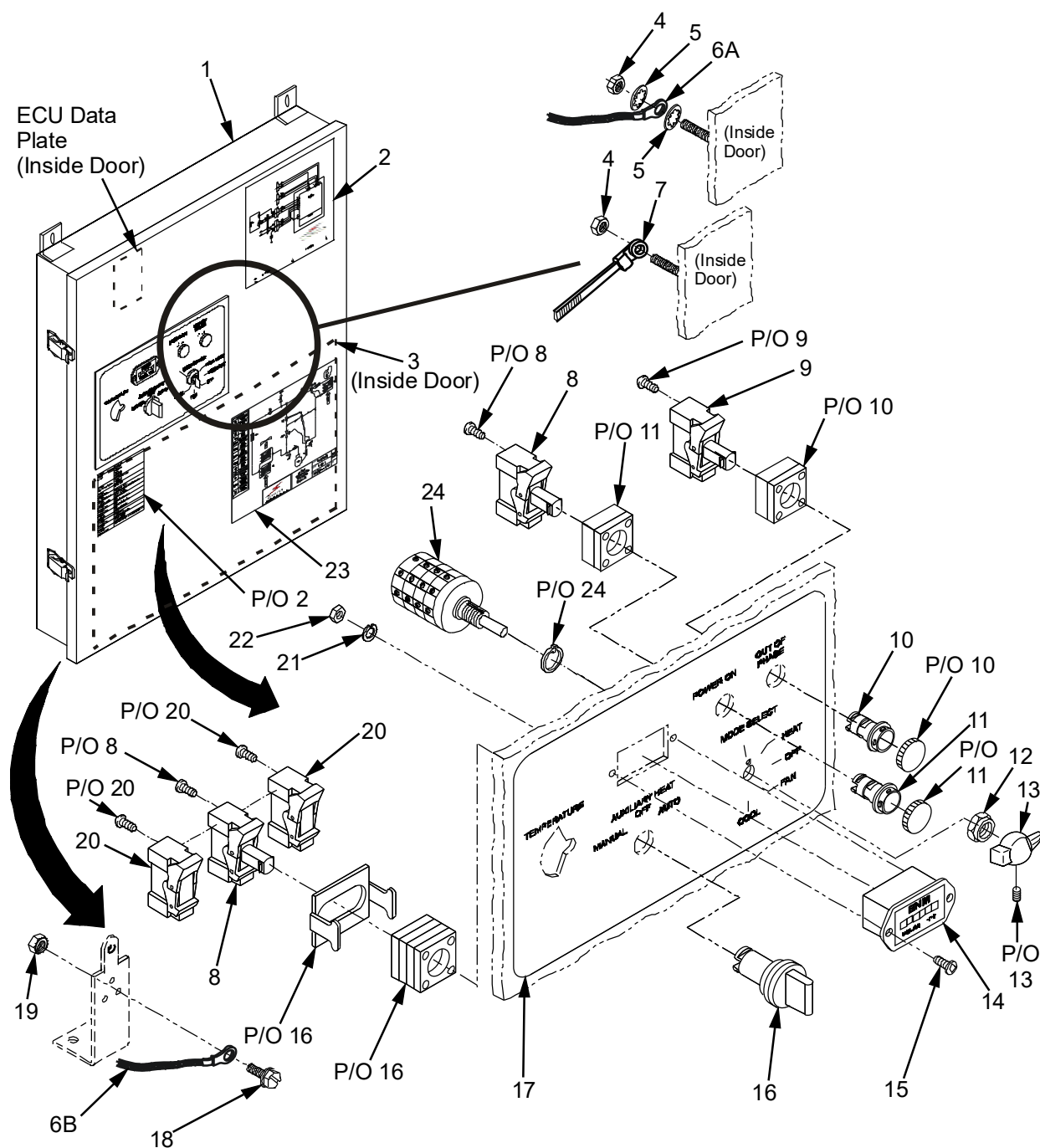


Figure 4. ECU Electrical Control Panel Assembly Details (Sheet 1 of 11).

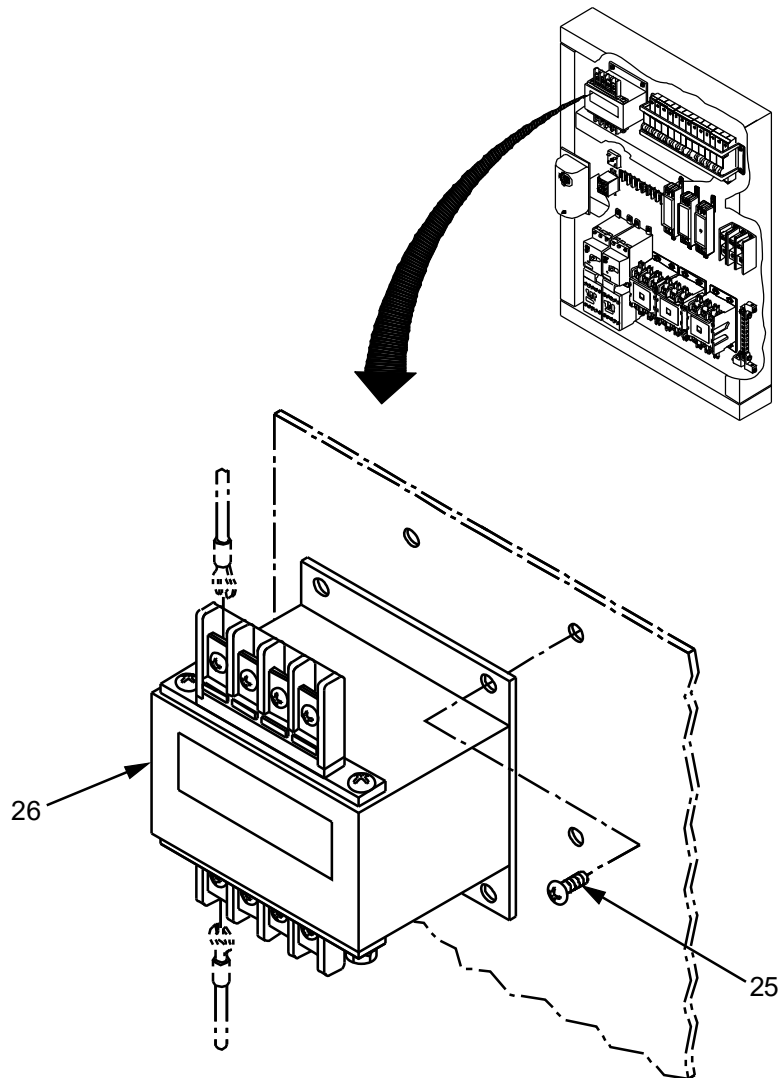


Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 2 of 11).

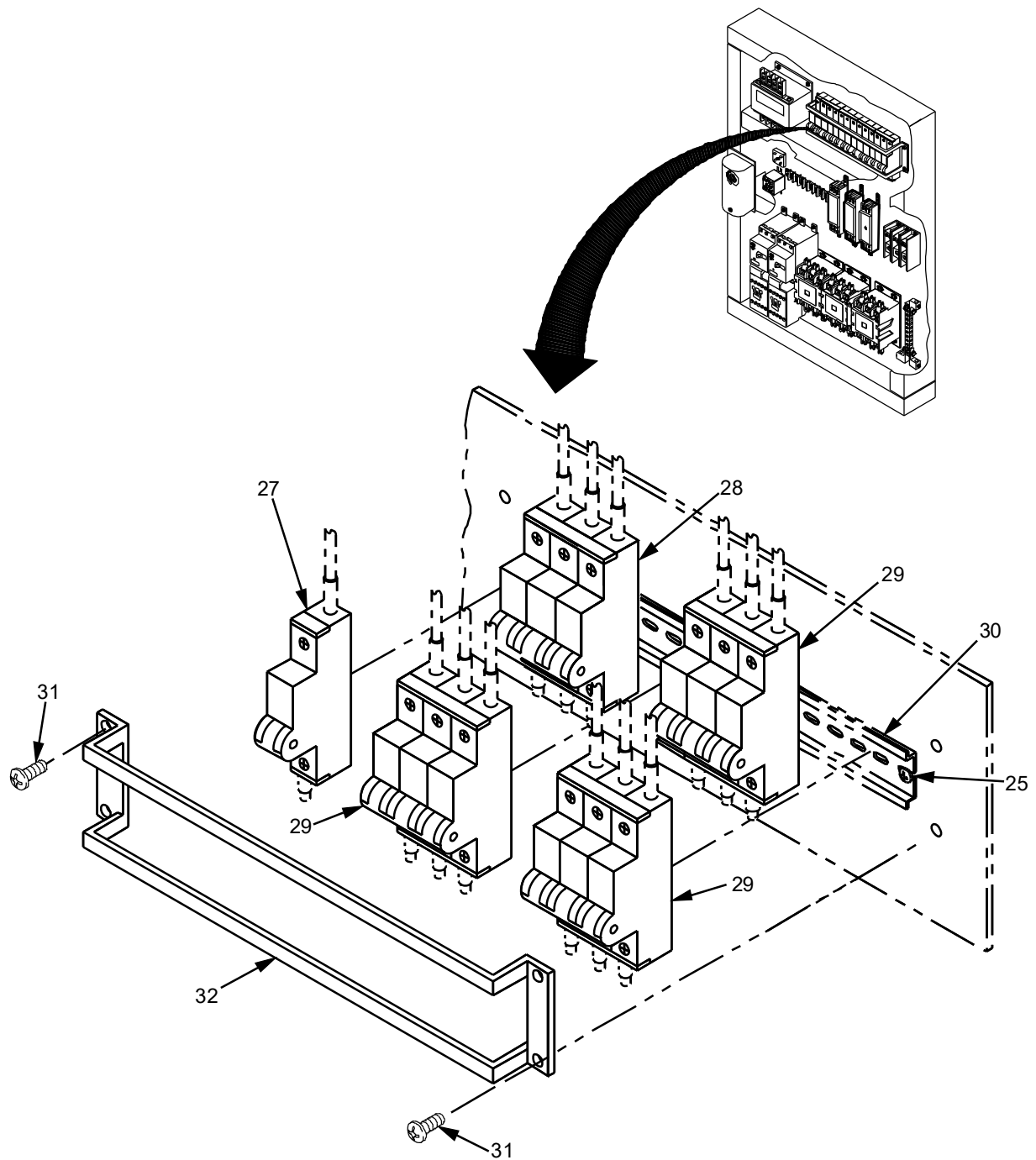


Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 3 of 11).

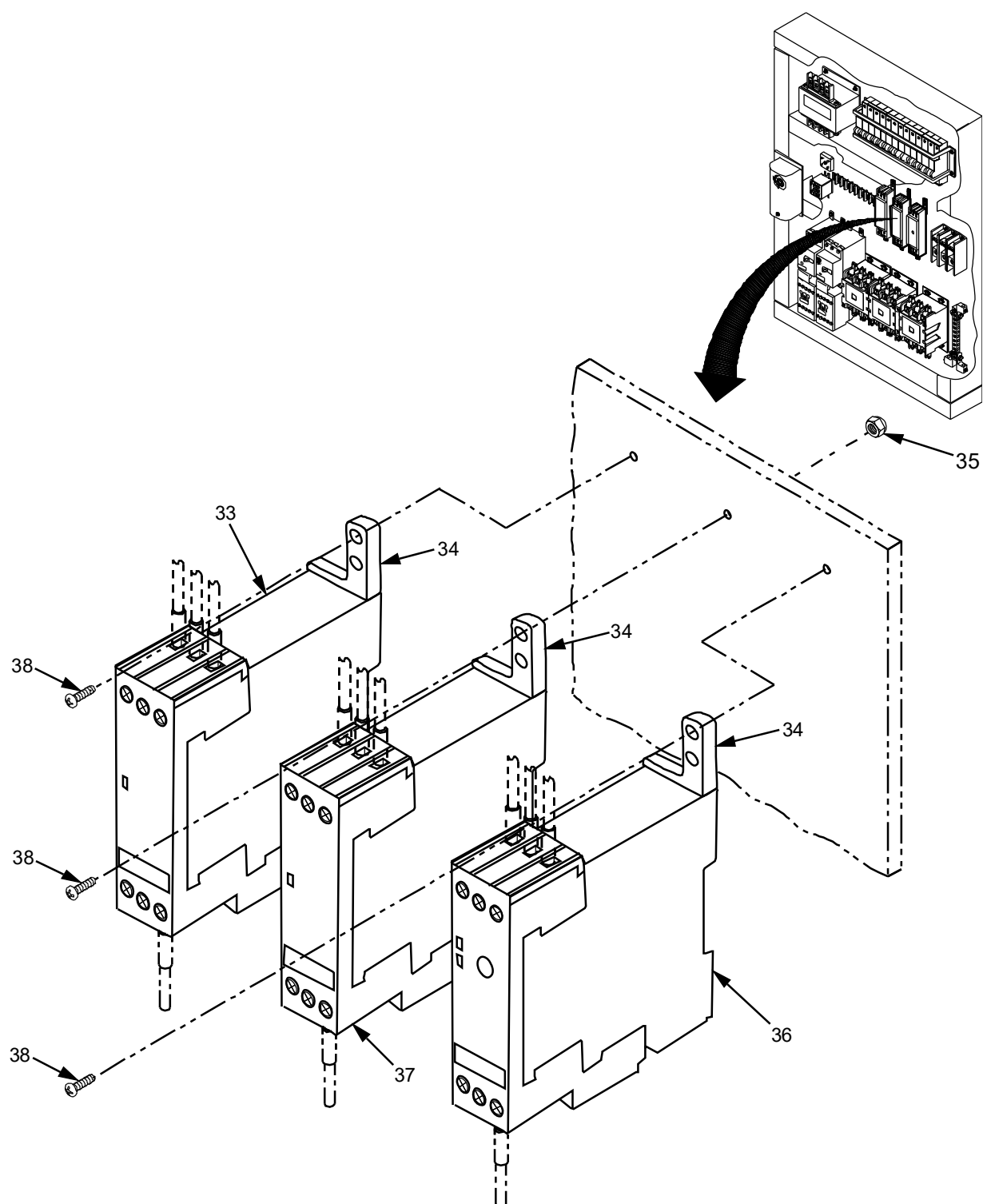


Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 4 of 11).

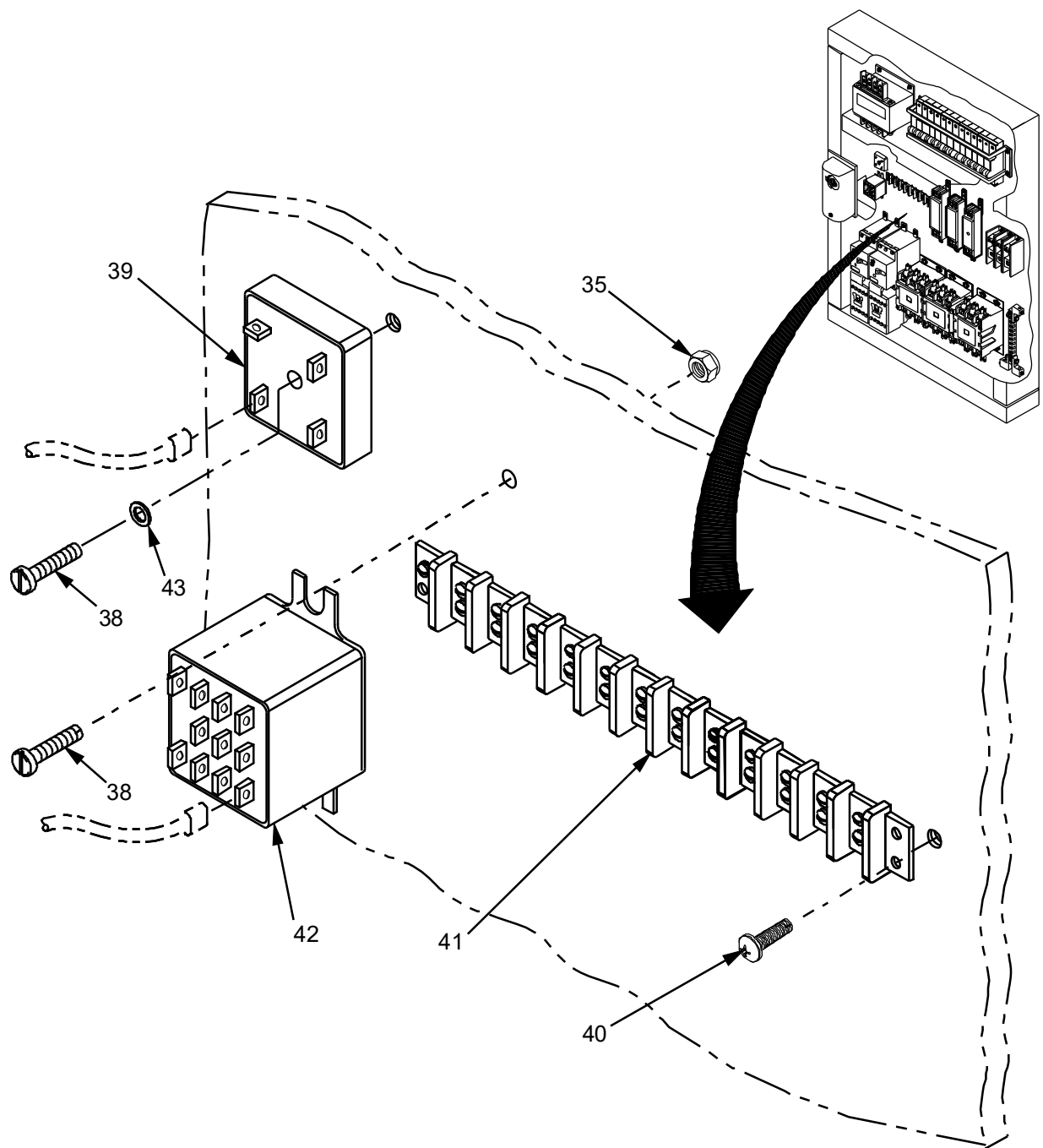
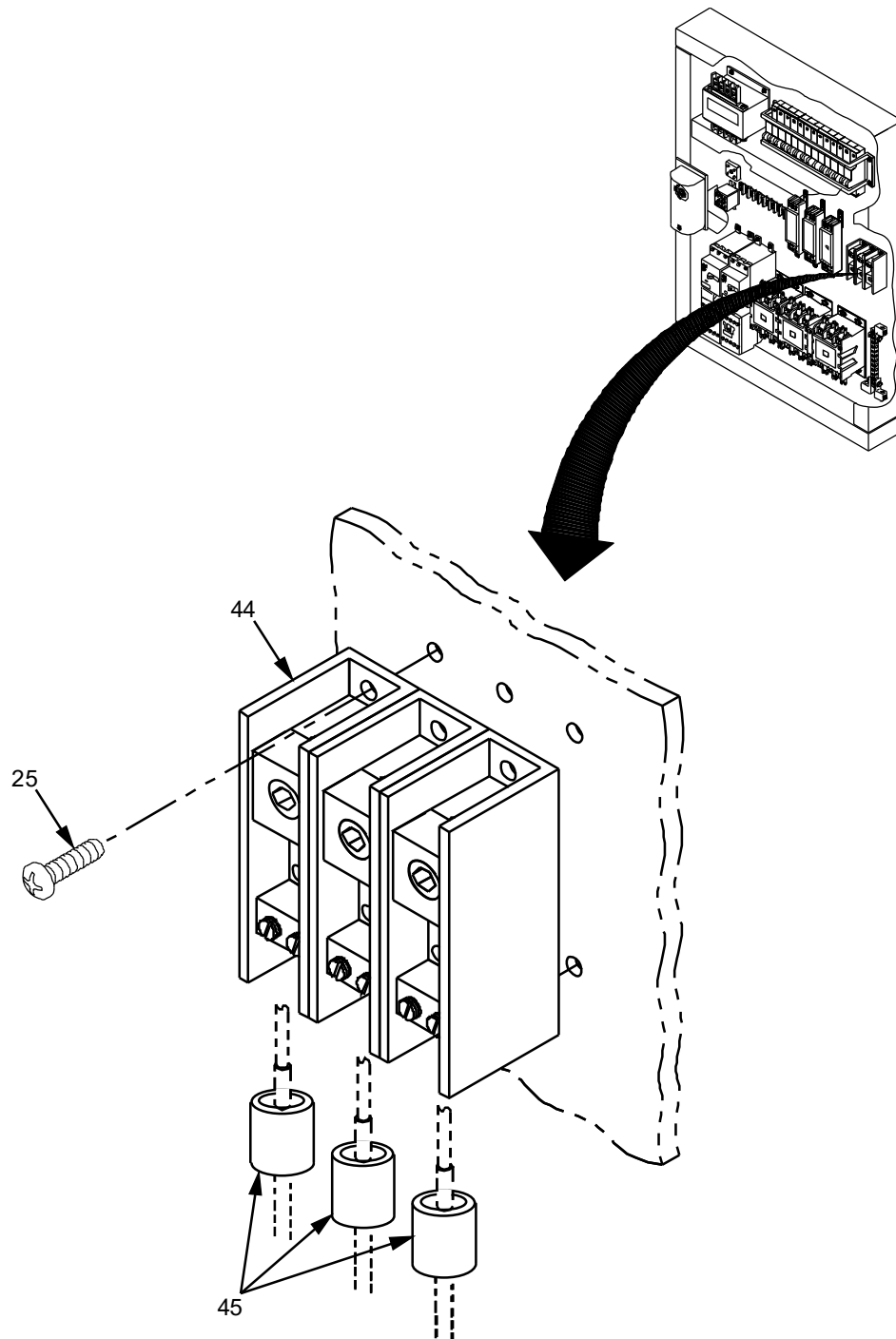


Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 5 of 11).



NOTE:
When replacing item #45, clear Silicon Caulking is required.
Refer to Chapter 11, Expendable and Durable Items List.

Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 6 of 11).

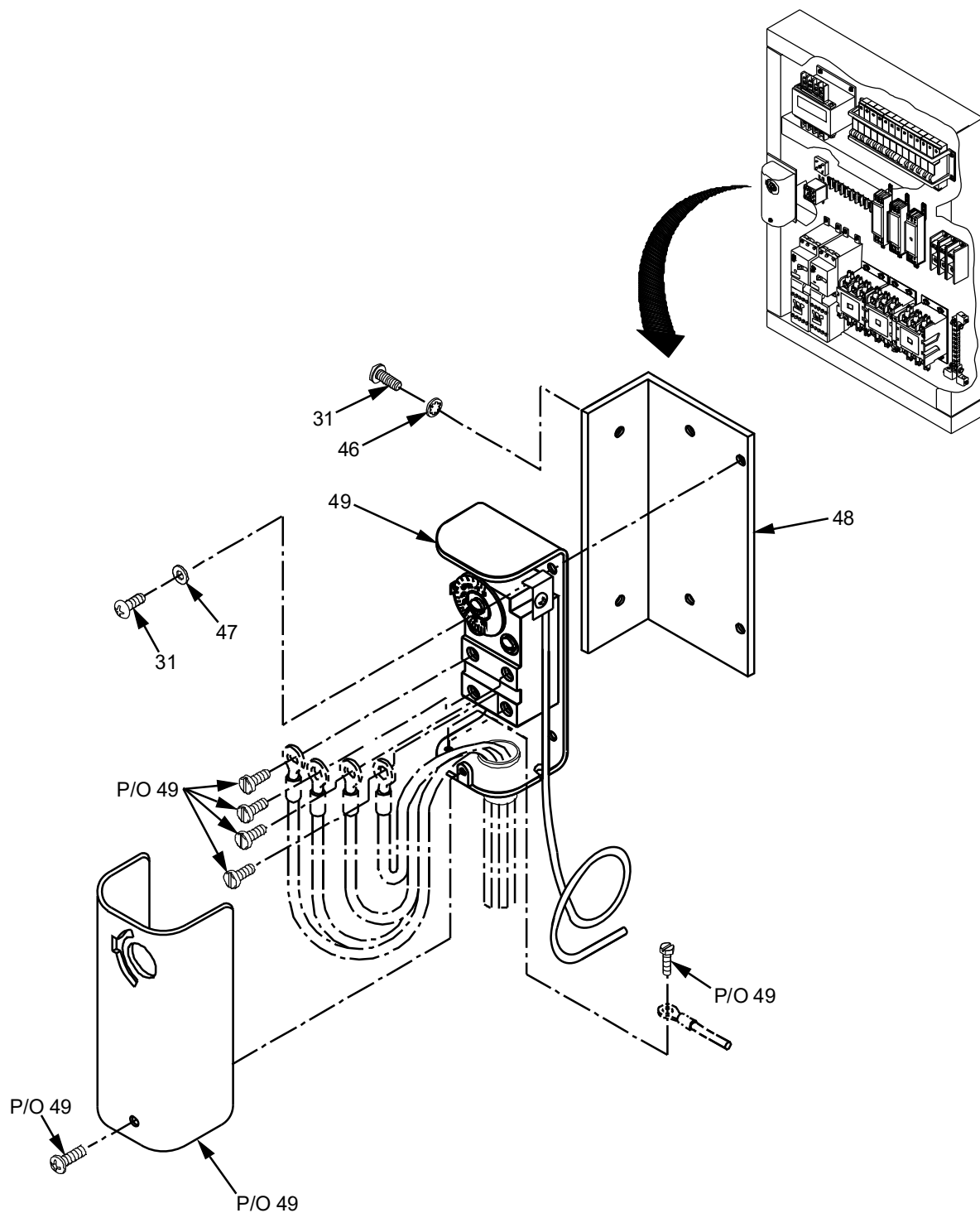


Figure 4. ECU Electrical Control Panel Assembly Details (Sheet 7 of 11).

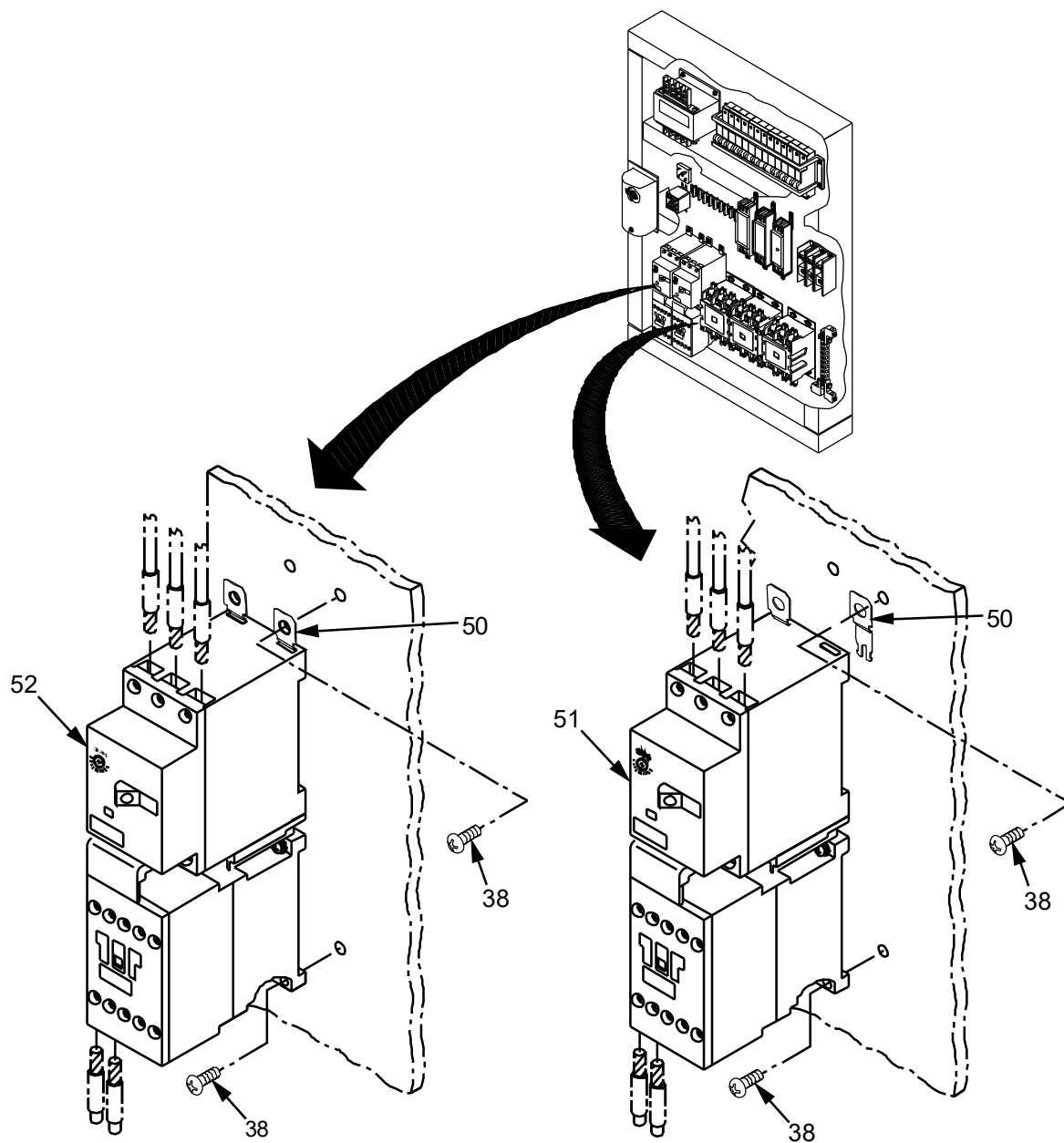


Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 8 of 11).

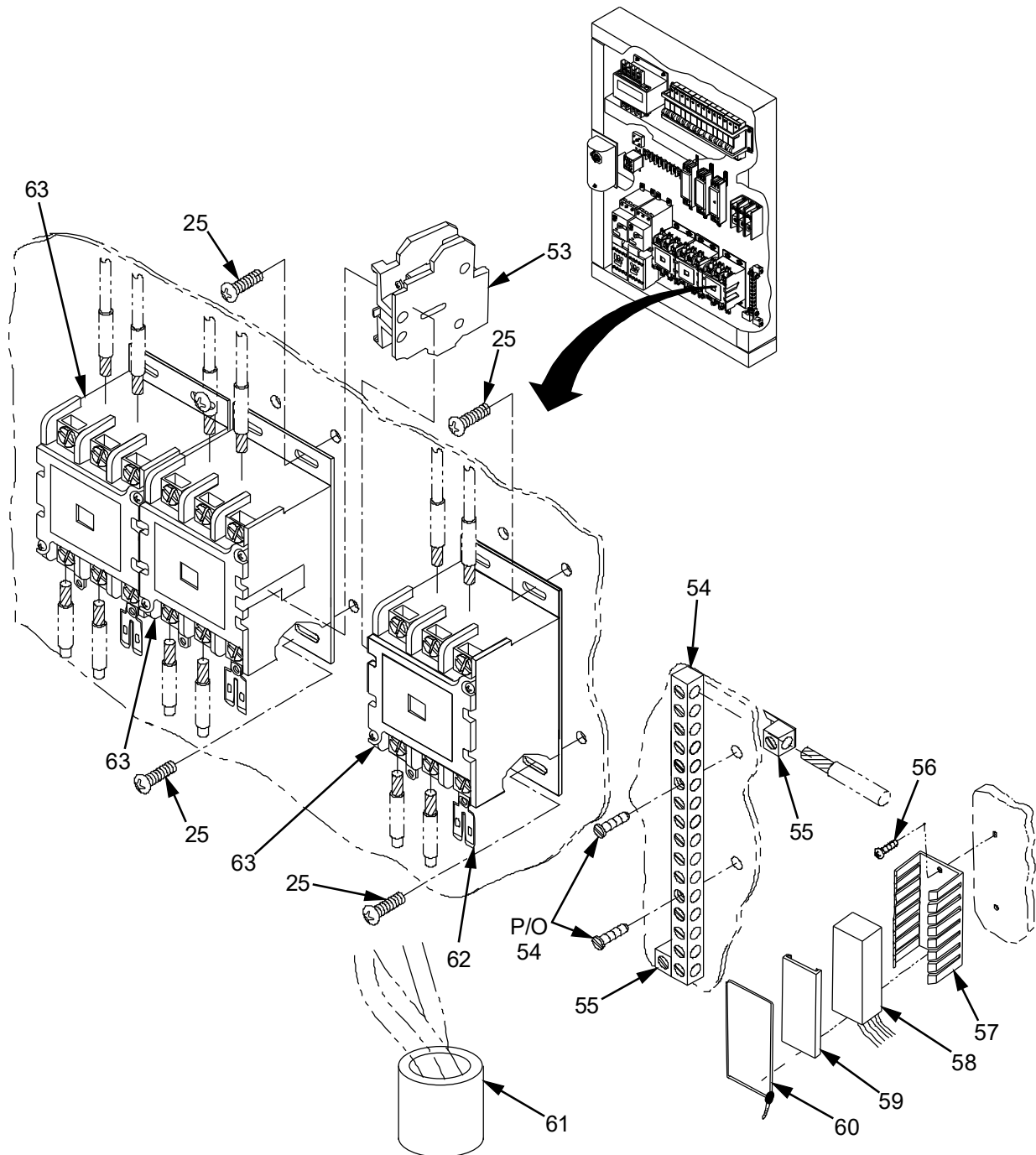


Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 9 of 11).

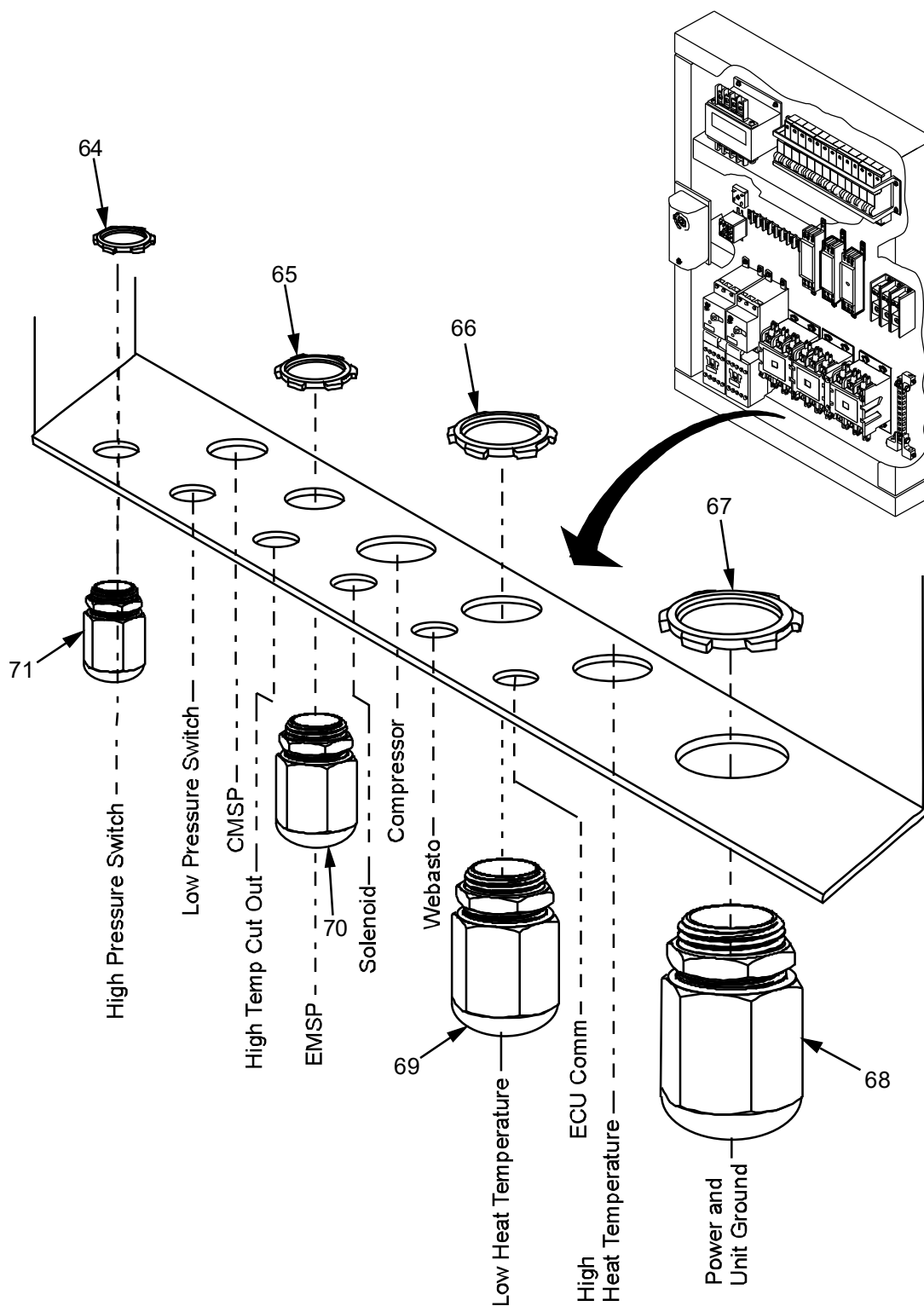


Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 10 of 11).

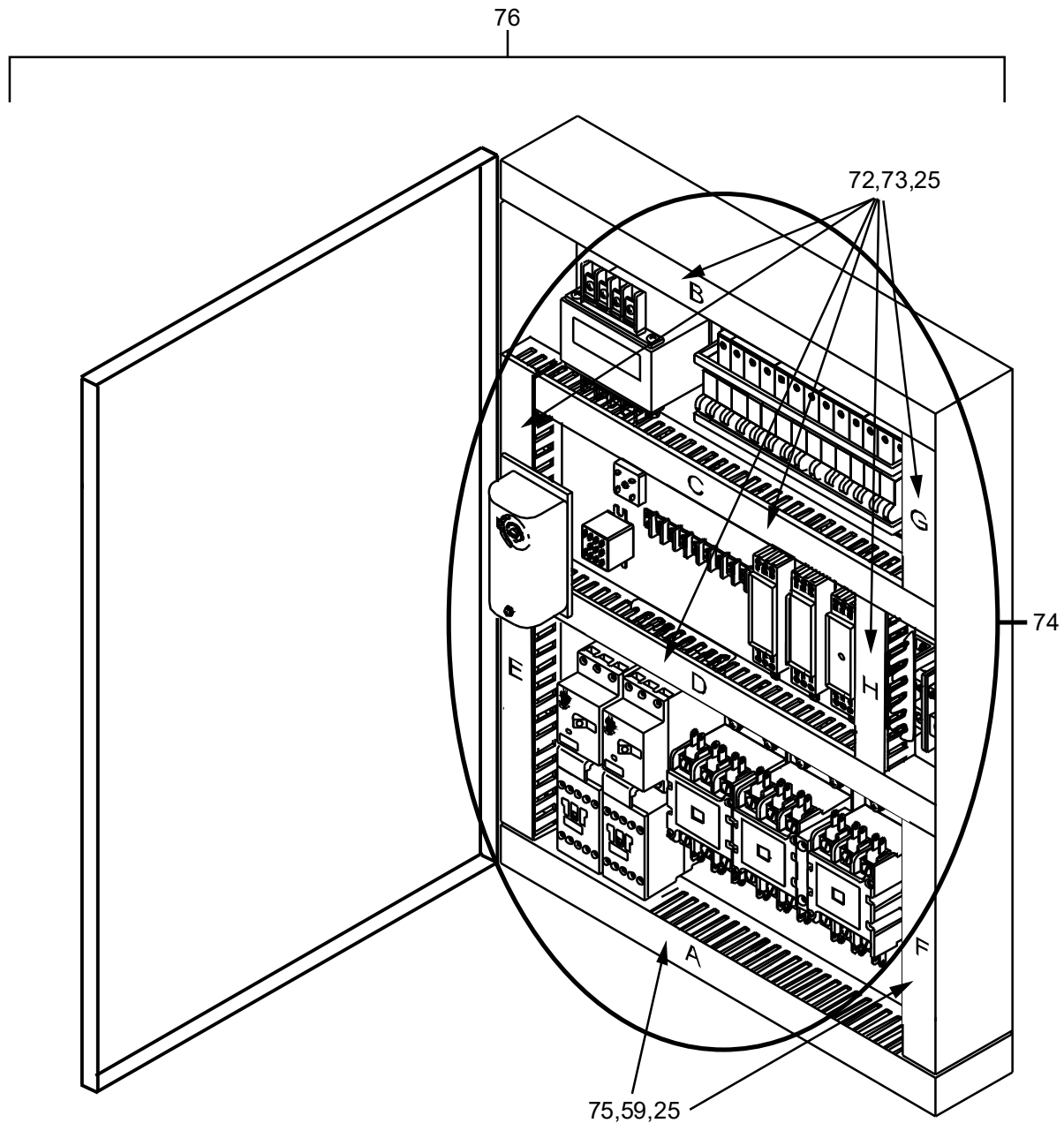


Figure 4. ECU Electrical Control Panel Assembly Details, (Sheet 11 of 11).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 0102						
FIGURE 4. ECU ELECTRICAL CONTROL PANEL ASSEMBLY DETAILS						
1	XBFZZ		7JYX1	1005987	CABINET,ELECTRICAL CONTROL	1
2	XBFZZ		7JYX1	1011688	PLACARD,ADHESIVE,SCHEMATI C,WEBASTO, W/FAULT CODES.	1
3	XBFZZ		7JYX1	1011689	PLACARD,ADHESIVE,SCHEMATI C,ELECTRICAL (INSIDE DOOR)	1
4	PAFZZ	5310-01-533-1805	7JYX1	1006297	NUT,PLAIN,HEXAGON	2
5	PAFZZ	5310-01-592-5630	7JYX1	1004484	WASHER,INTERNAL TOOTH	2
6	PAFZZ		7JYX1	1006296	CABLE,GROUND,ELECT ENCL..	2
7	PAFZZ		7JYX1	1000919	CABLE TIE,W/MOUNTING HOLE	1
8	PAFZZ	6250-01-568-1030	7JYX1	1000846	LAMPHOLDER,W/INTERGRATED LED,24V,GREEN	1
9	PAFZZ	6250-01-568-0001	7JYX1	1000844	LAMPHOLDER,W/INTERGRATED LED,24V,RED	1
10	PAFZZ	6210-01-552-1332	7JYX1	1000845	INDICATOR,LIGHT,LED,RED	1
11	PAFZZ	6210-01-552-1327	7JYX1	TG903-6762	INDICATOR,LIGHT,LED,GREEN	1
12	PAFZZ	5930-00-496-7492	7JYX1	1000849	BOOT,DUST AND MOISTURE SEAL	1
13	PAFZZ	5355-01-144-6166	7JYX1	TG903-3403	KNOB	1
14	PAFZZ	6645-01-567-8282	7JYX1	1000847	METER,HOUR,QUARTZ,AC	1
15	PAFZZ	5305-01-138-6292	7JYX1	1000858	SCREW,MACHINE	2
16	PAFZZ	5355-01-568-3921	7JYX1	1000848	KNOB,SELECTOR,3-POSITION, GREEN	1
17	XBFZZ		7JYX1	1011690	PLACARD,ADHESIVE,FACEPLAT E,ECU CONTROL PANEL	1
18	PAFZZ		7JYX1	1006284	SCREW,MACHINE,SLOTTED, HEXAGON HEAD,GREEN	1
19	PAFZZ		7JYX1	1006285	NUT,W/LOCK WASHER, HEXAGON,GREEN	1
20	PAFZZ	5999-01-568-1074	7JYX1	1000861	CONTACT,ELECTRICAL	2
21	PAFZZ	5310-01-585-3501	7JYX1	1004003	WASHER,LOCK,INTERNAL TOOTH	2
22	PAFZZ	5310-00-754-4406	7JYX1	1000859	NUT,PLAIN,HEXAGON	2
23	XBFZZ		7JYX1	1011691	PLACARD,ADHESIVE, REFRIGERATION SCHEMATIC ..	1
24	PAFZZ	5930-00-528-9728	7JYX1	TG903-4094	SWITCH,SELECTOR,ROTARY, 4-POSITION	1
25	PAFZZ	5305-01-568-1062	7JYX1	T270257	SCREW,MACHINE	44

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
26	PAFZZ	5950-01-412-4121	7JYX1	TG903-4069	TRANSFORMER,POWER.....	1
27	PAFZZ	5925-01-568-0000	7JYX1	TG903-5653	CIRCUIT BREAKER	1
28	PAFZZ	5925-01-568-1099	7JYX1	TG903-5654	CIRCUIT BREAKER	1
29	PAFZZ	5925-01-567-9997	7JYX1	TG903-4095	CIRCUIT BREAKER	3
30	PAFZZ		7JYX1	1003339	RAIL,DIN,SLOTTED	1
31	PAFZZ	5305-01-446-0679	7JYX1	H20022-9	SCREW,MACHINE	7
32	XBFZZ		7JYX1	1003020	BRACKET,CIRCUIT BREAKER ...	1
33	PAFZZ	5895-01-569-2953	7JYX1	PECU05T24	MONITOR,PHASE SEQUENCE...	1
34	PAFZZ	5975-01-583-3845	7JYX1	1004004	LUG,PUSH-IN	6
35	PAFZZ	5310-01-569-1792	7JYX1	T270150	NUT,PLAIN,HEXAGON	4
36	PAFZZ	5945-01-568-7389	7JYX1	1000903	RELAY,TIMING	1
37	PAFZZ		7JYX1	1011635	RELAY,COIL	1
38	PAFZZ	5305-01-568-4710	7JYX1	T270130	SCREW,MACHINE	11
39	PAFZZ	5961-01-148-3364	7JYX1	T260731	RECTIFIER,SEMI-CONDUCTOR DEVICE	1
40	PAFZZ	5305-01-446-0682	7JYX1	1000855	SCREW,MACHINE	2
41	PAFZZ		7JYX1	1006016	BLOCK,TERMINAL	1
42	PAFZZ		7JYX1	1014285	RELAY.....	1
43	PAFZZ	5310-01-533-0370	7JYX1	T270180	WASHER,FLAT	1
44	PAFZZ	5940-01-568-7575	7JYX1	TG903-5702	TERMINAL,JUNCTION BLOCK,SECTIONAL	1
45	PAFZZ		7JYX1	1006078	FERRITE,AXIAL,BEAD	3
46	PAFZZ		7JYX1	1006286	WASHER,LOCK,INTERNAL TOOTH	2
47	PAFZZ	5310-01-583-8581	7JYX1	T270080	WASHER,FLAT	4
48	XBFZZ		7JYX1	1011693	BRACKET,ANGLE,THERMOSTAT ..	1
49	PAFZZ	5930-01-568-7446	7JYX1	PECU08W31	THERMOSTAT,TEMPERATURE SENSOR	1
50	PAFZZ	5975-01-583-9831	7JYX1	TG903-5555-2	LUG,PUSH-IN	4
51	PAFZZ		7JYX1	1000902	EVAPORATOR MOTOR STARTER PROTECTOR,(EMSP)	1
52	PAFZZ		7JYX1	PECU05T23B	CONDENSER MOTOR STARTER PROTECTOR,(CMSP)	1
53	PAFZZ		7JYX1	1011672	CONTACT,AUXILIARY	1
54	PAFZZ	5940-01-584-1528	7JYX1	1000901	KIT,LUG,GROUND STRIP	1
55	PAFZZ	5940-01-584-1518	7JYX1	1000850	LUG,TERMINAL STRIP, GROUNDING	2
56	PAFZZ	5305-01-538-8011	7JYX1	1005616	SCREW,MACHINE	2
57	PAFZZ	5910-01-583-9850	7JYX1	1003312	WIRE-WAY CHANNEL	1
58	XBFZZ	5910-01-582-0248	7JYX1	1005609	CAPACITOR,EMI,ASSEMBLY	1
59	PAFZZ	5910-01-585-3472	7JYX1	1003313	COVER,WIRE-WAY	2
60	PAFZZ	5975-00-762-1251	7JYX1	1005617	CABLE TIE	1

(1)	(2)	(3)	(4)	(5)	(6)	(7)
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TM: 1006310

0114-14

HDT Expeditionary Systems, Inc.

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ITEM NO.	SMR CODE	NSN	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
61	PAFZZ		7JYX1	1011694	FERRITE BEAD	1
62	PAFZZ	5940-00-276-0678	7JYX1	1011695	ADAPTER,TERMINAL	3
63	PAFZZ		7JYX1	1011673	CONTACTOR	3
64	PAFZZ		7JYX1	TG903-5113	LOCKNUT,CONDUIT	6
65	PAFZZ	5975-01-586-9477	7JYX1	T240504	LOCKNUT,CONDUIT	2
66	PAFZZ		7JYX1	T240506	LOCKNUT,CONDUIT	3
67	PAFZZ		7JYX1	T240511	LOCKNUT,CONDUIT	1
68	PAFZZ	5975-00-660-4294	7JYX1	1011696	CORD CONNECTOR	1
69	PAFZZ		7JYX1	1004960	CORD CONNECTOR	3
70	PAFZZ		7JYX1	1004961	CORD CONNECTOR	2
71	PAFZZ		7JYX1	1004959	CORD CONNECTOR	6
72	PAFZZ		7JYX1	1011636	WIRE-WAY,(FOR DETAIL B,C,D,E,G,H)	1
73	PAFZZ		7JYX1	1011637	COVER,WIRE-WAY	1
74	XBFZZ		7JYX1	1011697	KIT,ELECTRICAL COMPONENTS, (NO ENCLOSURE)	1
75	PAFZZ		7JYX1	1003311	WIRE-WAY,(FOR DETAIL A,F) ...	1
76	XBFZZ		7JYX1	1011684	SUBASSEMBLY,ELECTRICAL PANEL,COMPLETE, (W/HEAT,W/LOAD SHED)	1
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
REPAIR PARTS LIST
GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN

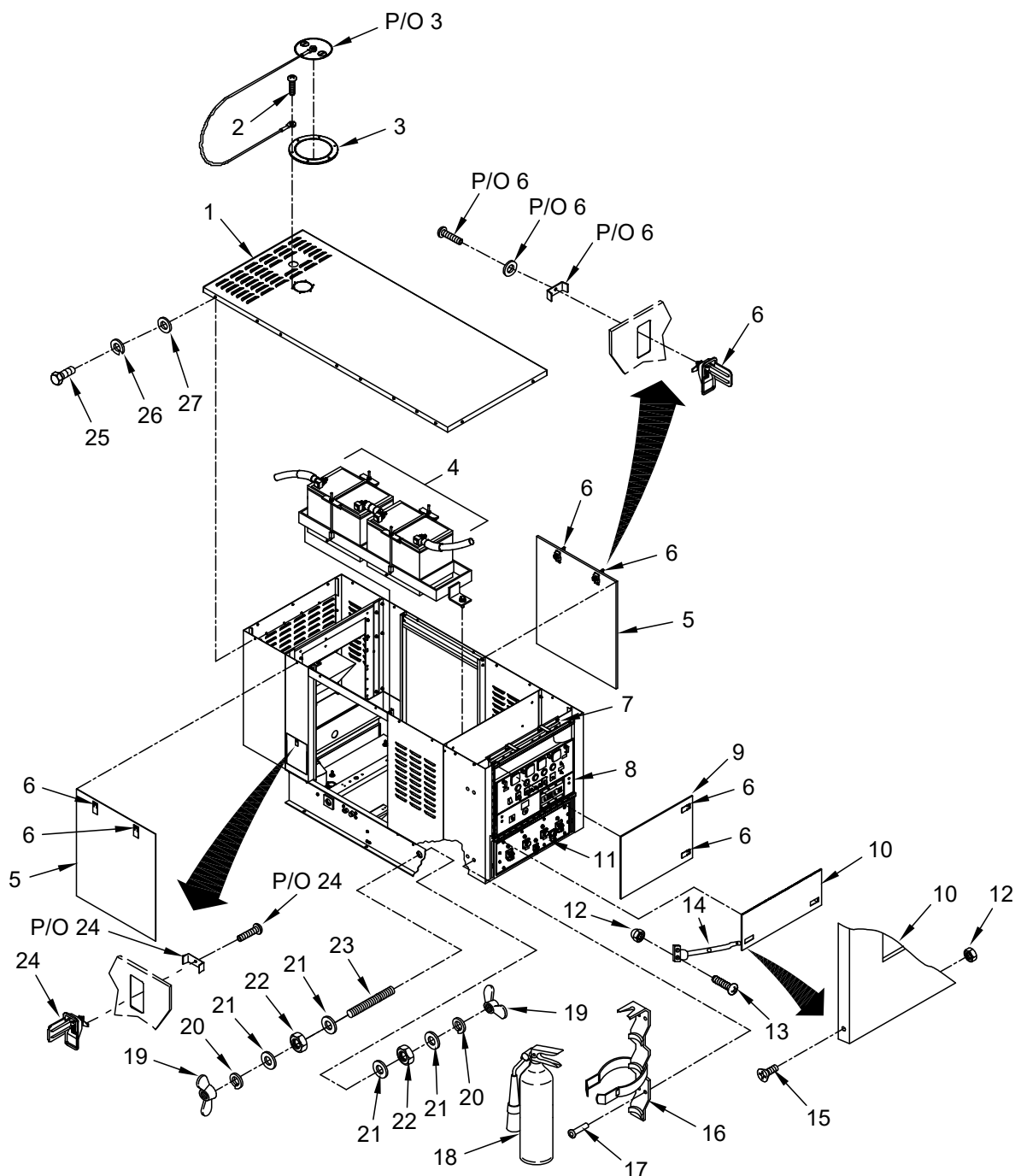


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 1 of 10).

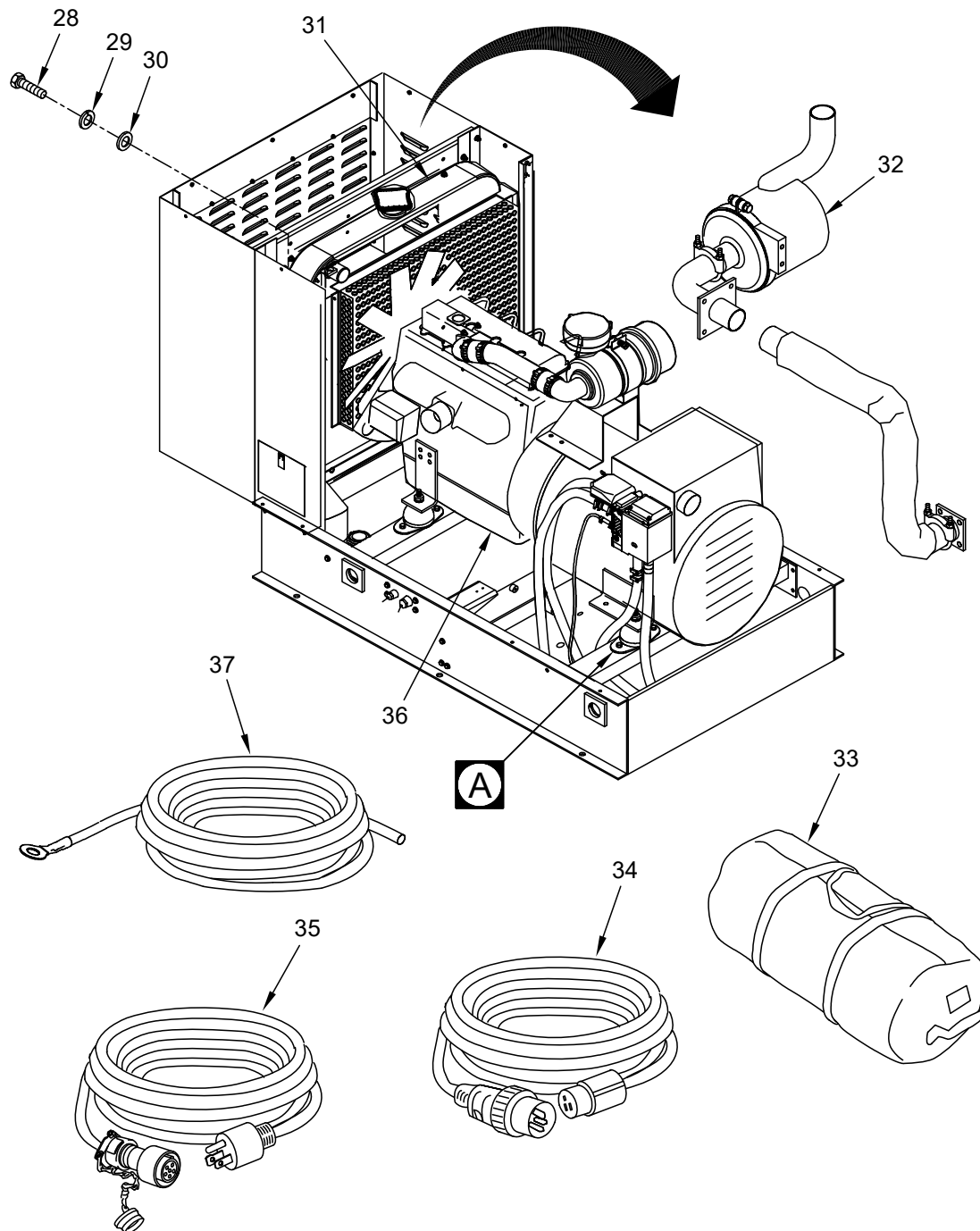


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 2 of 10).

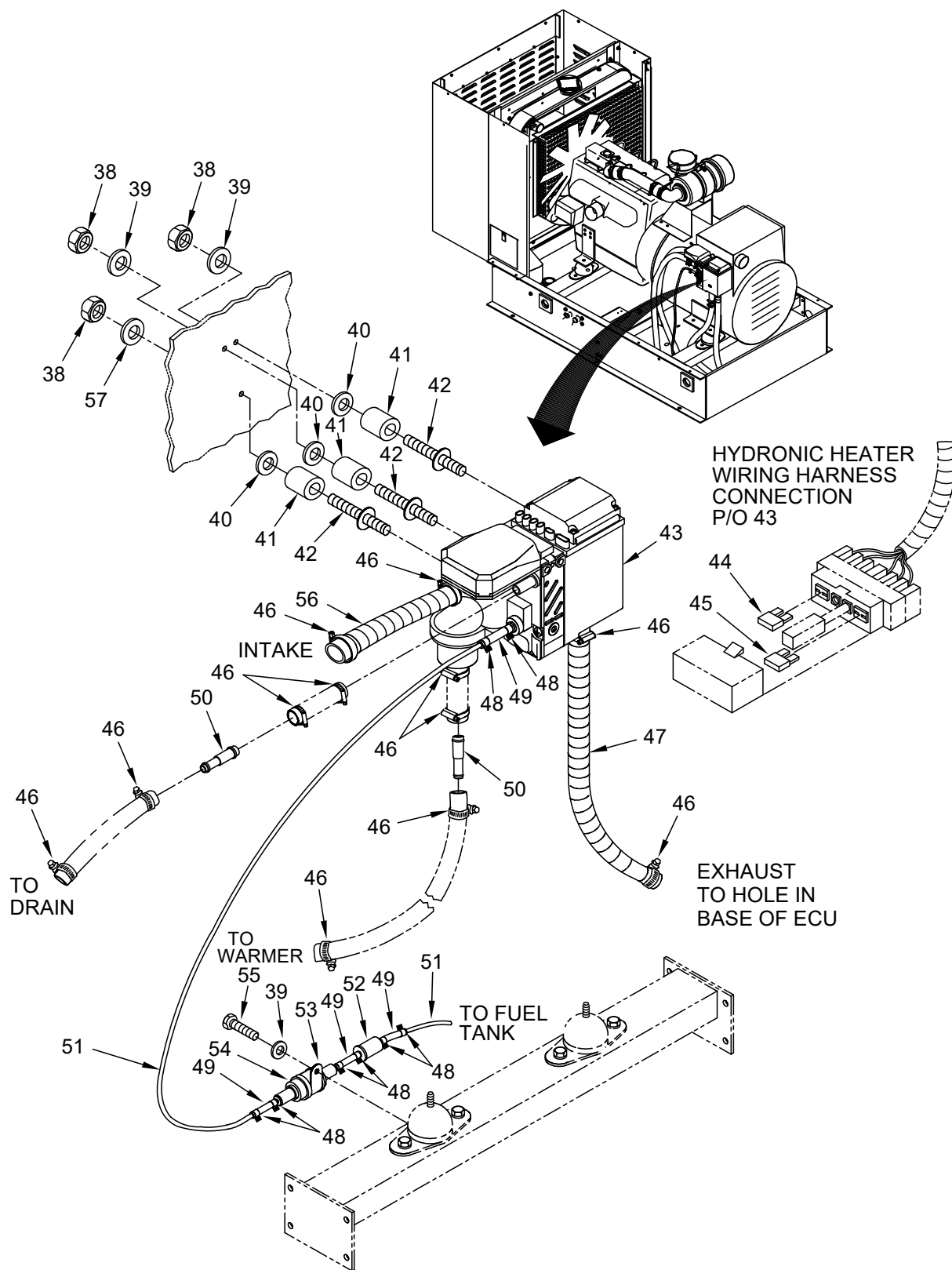


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 3 of 10).

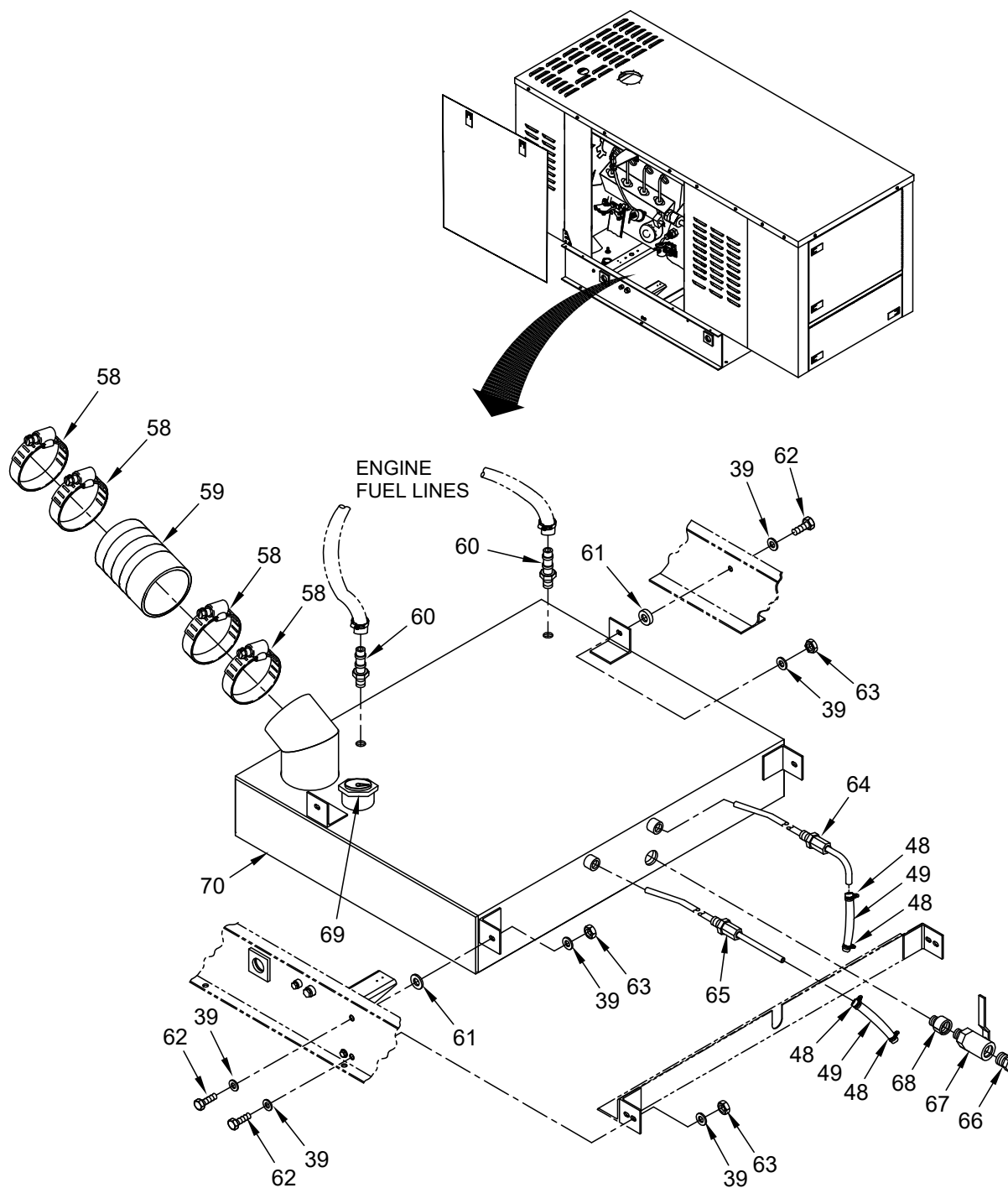


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 4 of 10).

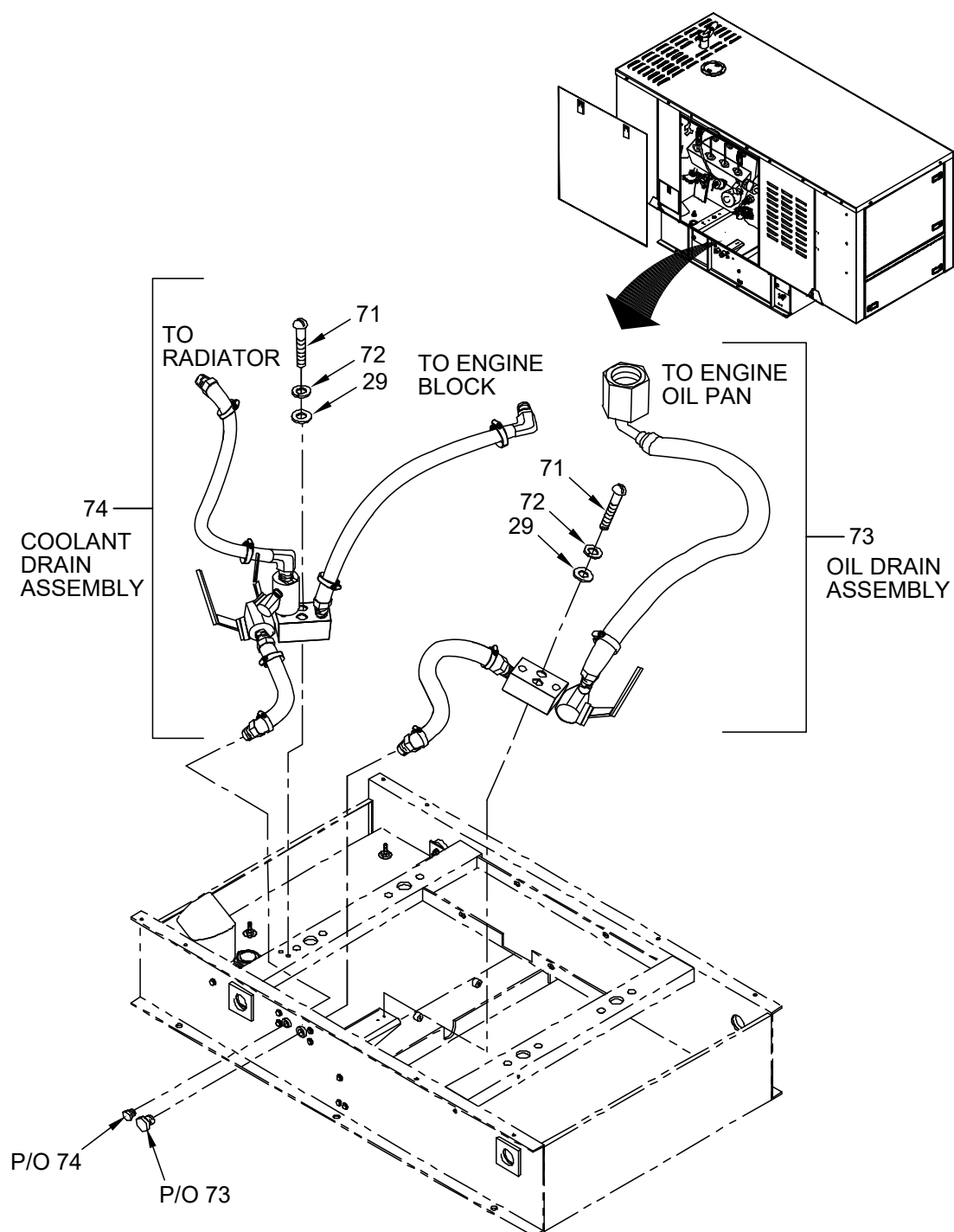


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 5 of 10).

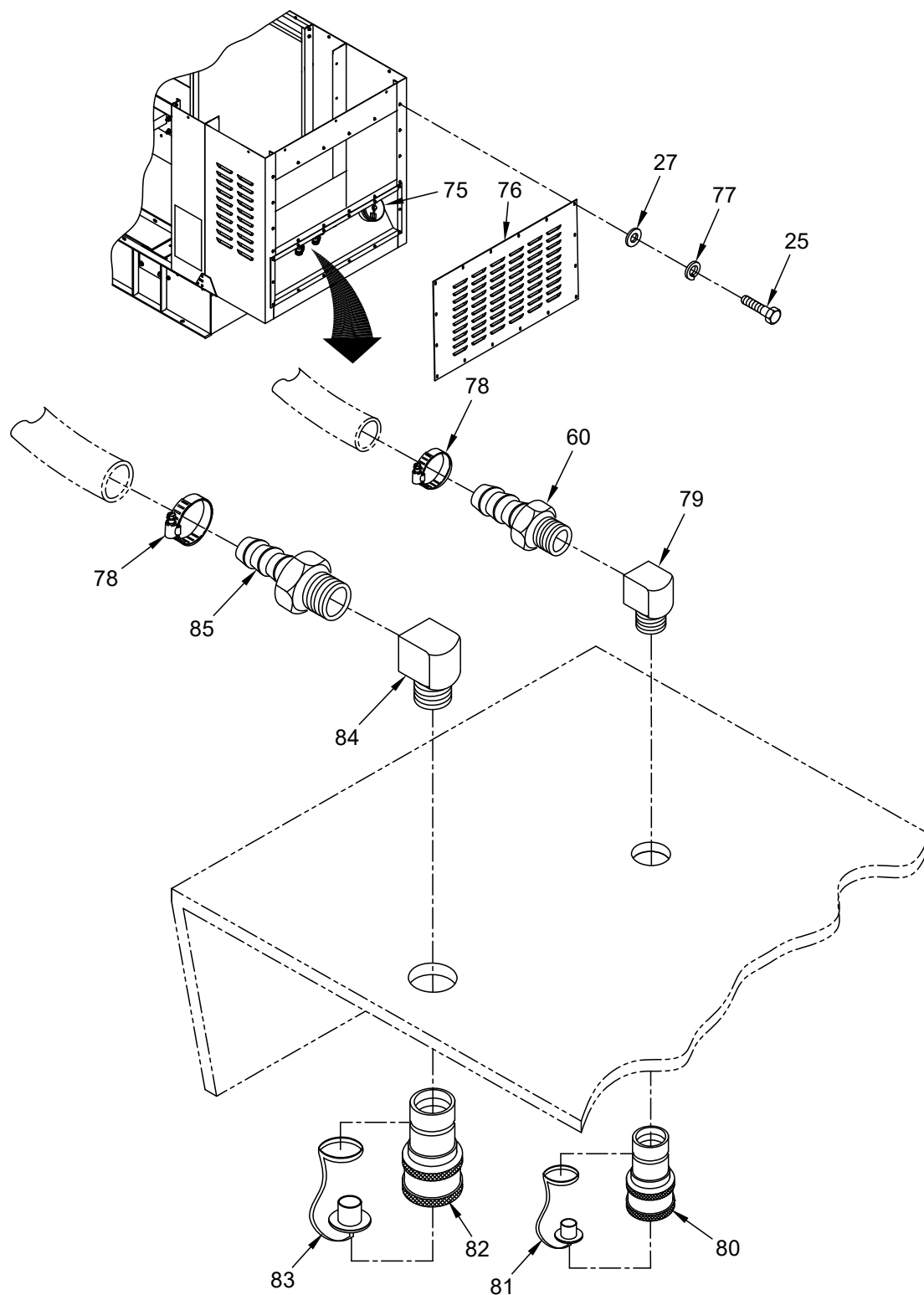


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 6 of 10).

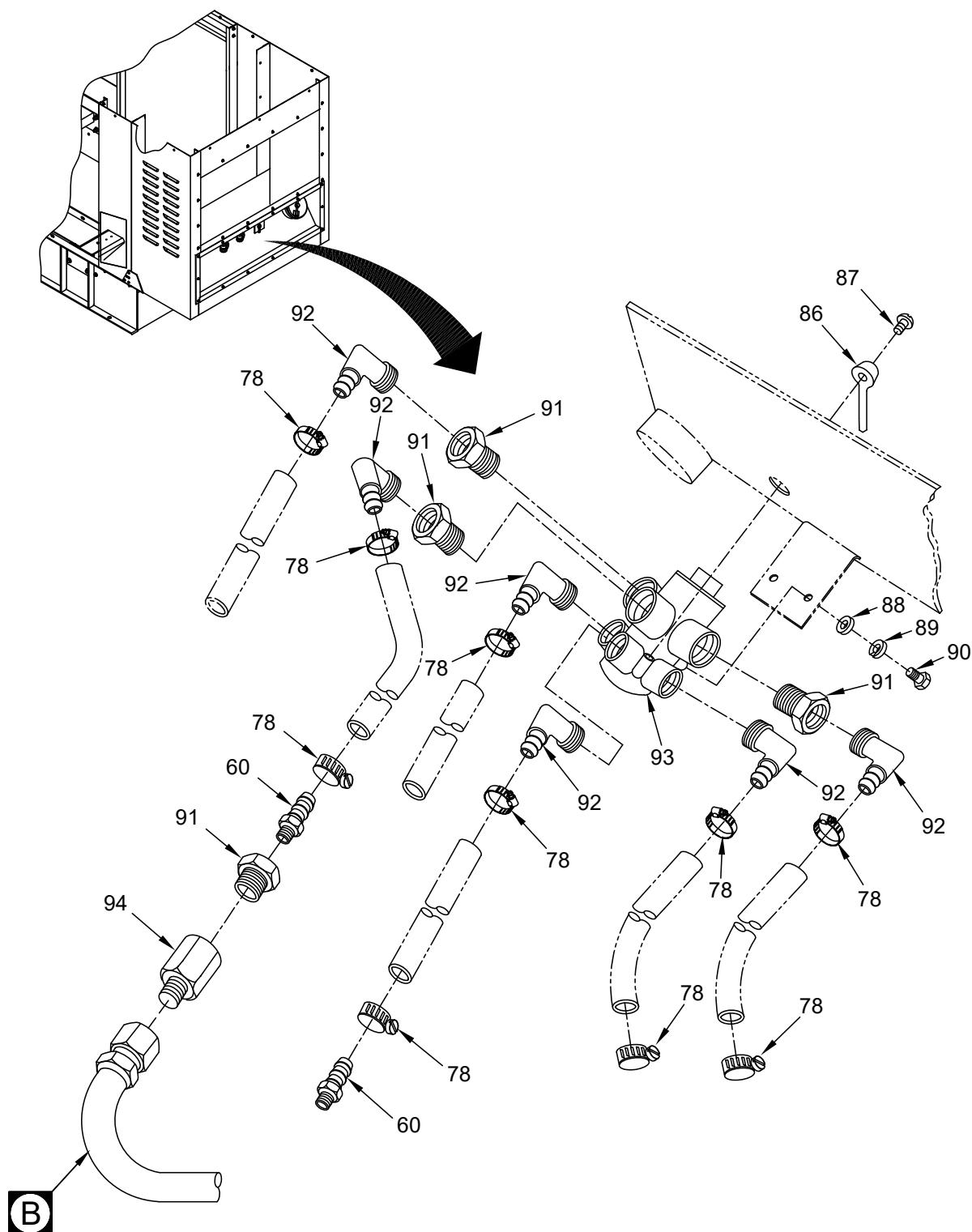


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 7 of 10).

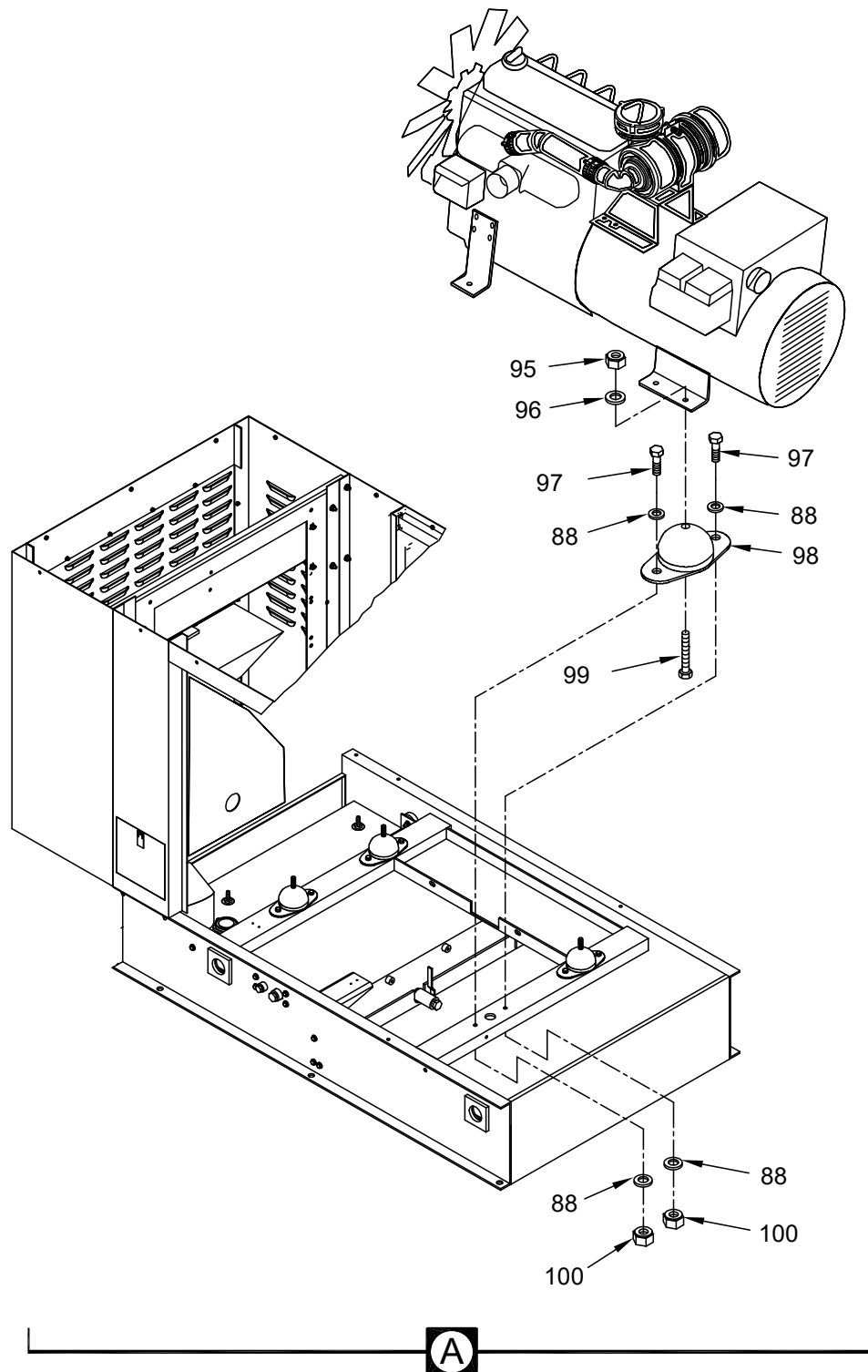


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 8 of 10).

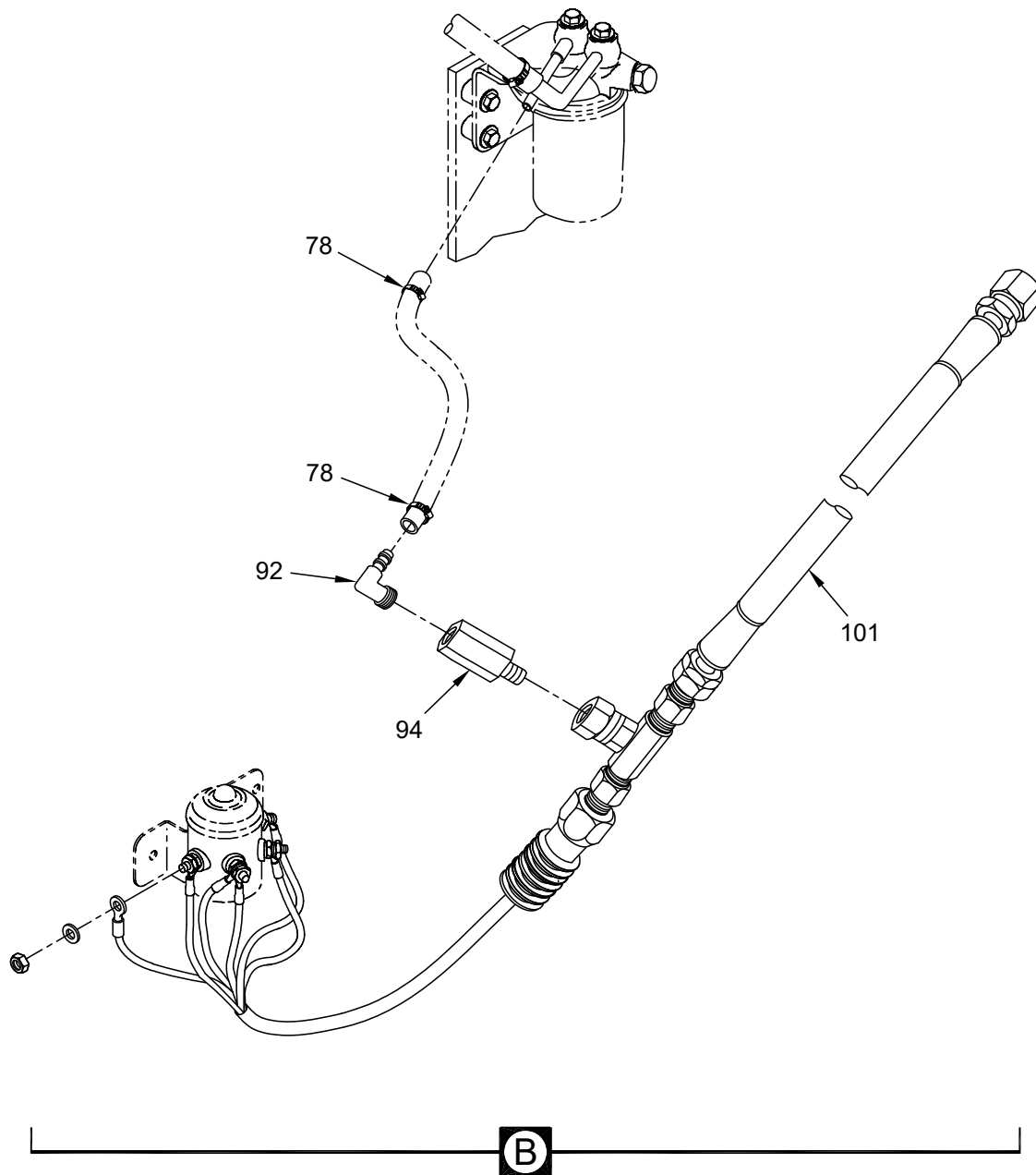


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 100720 GREEN, 1007205 TAN (Sheet 9 of 10).

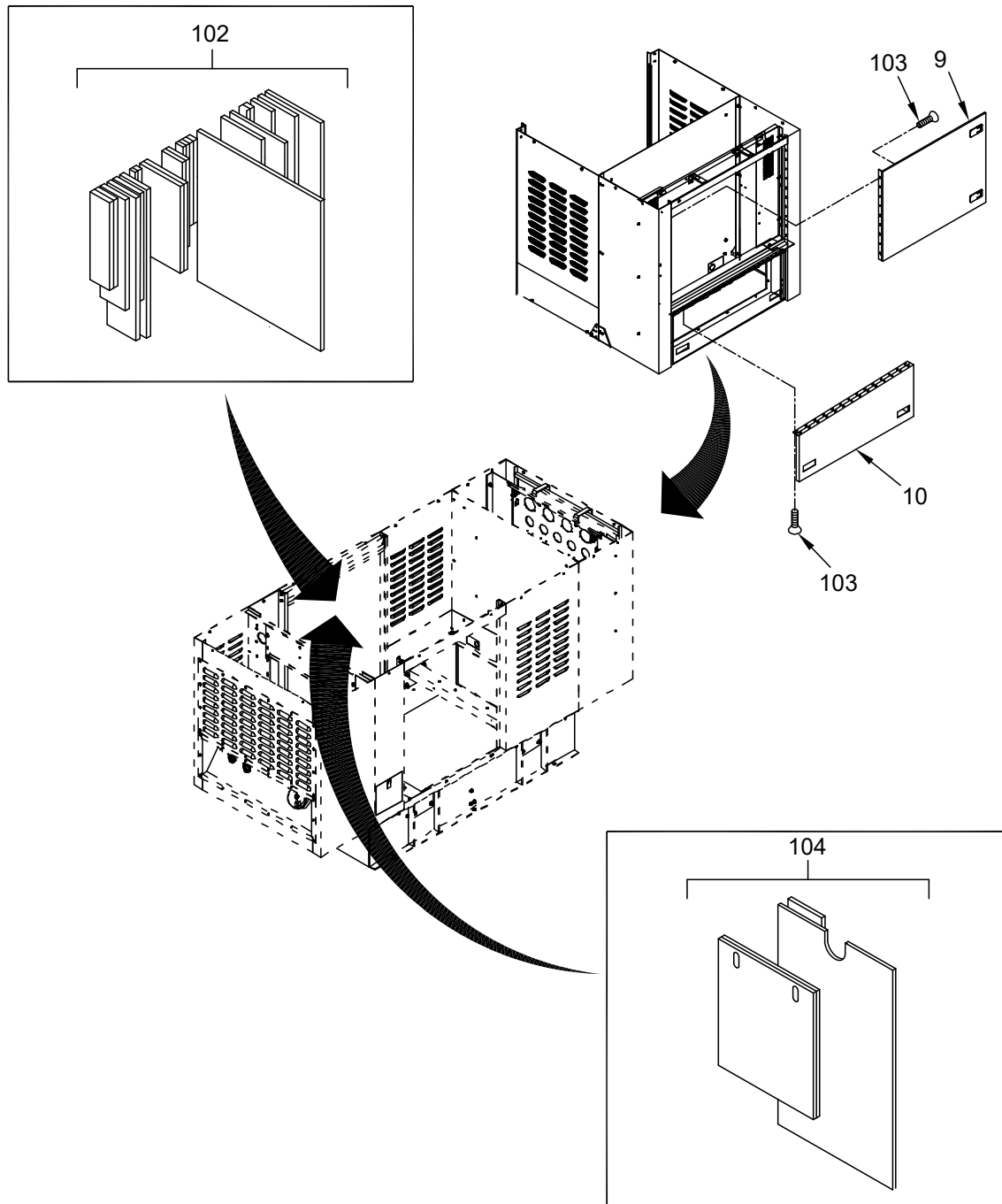


FIGURE 5. GENSET w/ENCL ,18kW, 60Hz, ANALOG, 1007206 GREEN, 1007205 TAN (Sheet 10 of 10).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
					GROUP 0102	
					FIGURE 5. GENSET W/ENCL ,18KW, 60HZ, ANALOG, 1007206 GREEN, 1007205 TAN	
1	XBFZZ		7JYX1	1006874	PANEL,ACCESS..... UOC: 89W	1
1	XBFZZ		7JYX1	1006873	PANEL,ACCESS..... UOC: 89X	1
2	PAFZZ	5305-01-583-5489	7JYX1	T270037	SCREW,TAPPING.....	6
3	PAFZZ	5340-01-497-5810	7JYX1	T220090	COVER,ACCESS.....	1
4	XBFFF		7JYX1	T235064	BATTERY ASSEMBLY (SEE FIGURE 6 FOR BREAKDOWN).....	1
5	XBFZZ		7JYX1	1009994	PANEL,ACCESS..... UOC: 89W	2
5	XBFZZ		7JYX1	1009995	PANEL,ACCESS..... UOC: 89X	2
6	PAFZZ	5340-01-533-1330	7JYX1	T220055	LEVER,MANUAL CONTROL.....	8
7	XCDDD		7JYX1	T225250-5	BARRIER PANEL ASSEMBLY (SEE FIGURE 14 FOR BREAKDOWN).....	1
8	XCDDD		7JYX1	T225453	CONTROL PANEL ASSEMBLY (SEE FIGURE 15 FOR BREAKDOWN).....	1
9	XBFZZ		7JYX1	1007404	PANEL,ACCESS..... UOC: 89W	1
9	XBFZZ		7JYX1	1007405	PANEL,ACCESS..... UOC: 89X	1
10	XBFZZ		7JYX1	TG430-2005G	PANEL,ACCESS..... UOC: 89W	1
10	XBFZZ		7JYX1	TG430-2005T	PANEL,ACCESS..... UOC: 89X	1
11	XCDDD		7JYX1	T225853	POWER DISTRIBUTION (SEE FIGURE 13 FOR BREAKDOWN)	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
12	PAFZZ	5310-01-569-2130	7JYX1	T270160	NUT,SELF-LOCKING, HEXAGON	6
13	PAFZZ	5305-01-569-1803	7JYX1	T270115	SCREW,MACHINE	4
14	PAFZZ	5340-01-315-8389	7JYX1	T270983	STAY,LOCKING.....	2
15	PAFZZ	5305-01-568-4710	7JYX1	T270130	SCREW,MACHINE	2
16	XBFFZ	4210-01-259-5634	7JYX1	1006035	BRACKET,FIRE EXTINGUISHER	1
17	PAFZZ	5320-01-025-6328	7JYX1	T270940	RIVET,BLIND	4
18	PAFZZ	4210-01-552-5109	7JYX1	T295175	EXTINGUISHER,FIRE	1
19	PAFZZ	5310-01-533-2915	7JYX1	T270570	NUT,PLAIN,WING.....	2
20	PAFZZ	5310-01-563-2566	7JYX1	T270595	WASHER,LOCK.....	2
21	PAFZZ	5310-01-569-5414	7JYX1	T270585	WASHER,FLAT	36
22	PAFZZ	5310-01-485-7896	7JYX1	T270555	NUT,PLAIN, HEXAGON	2
23	PAFZZ	5307-01-569-2135	7JYX1	T270546	STUD,CONTINUOUS THREAD	1
24	PAFZZ	5340-01-267-2904	7JYX1	T210960	FASTENER,PAWL.....	1
25	PAFZZ	5305-01-553-0345	7JYX1	T270242	SCREW,CAP,HEXAGO N HEAD	36
26	PAFZZ	5310-01-555-6402	7JYX1	T270290	WASHER, LOCK.....	20
27	PAFZZ	5310-01-555-7064	7JYX1	T270281	WASHER,FLAT	36
28	PAFZZ	5305-01-552-4509	7JYX1	T270135	SCREW,MACHINE	6
29	PAFZZ	5310-01-553-0370	7JYX1	T270180	WASHER,FLAT	10
30	PAFZZ	5310-01-552-4523	7JYX1	T270280	WASHER,FLAT	6
31	XCFFF		7JYX1	TG421-9000	RADIATOR INSTALLATION (SEE FIGURE 10 FOR BREAKDOWN).....	1
32	XCFFF		7JYX1	T235005	EXHAUST ASSEMBLY (SEE FIGURE 11 FOR BREAKDOWN).....	1
33	XBFFZ	8340-01-557-3403	7JYX1	MA100155	BAG,TENT FRAME PART	1
34	PAFZZ	5995-01-552-6935	7JYX1	T295101	CABLE ASSEMBLY,SPECIAL PURPOSE, ELECTRICAL	2

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
35	PAFZZ	5995-01-552-8232	7JYX1	T295111	CABLE ASSEMBLY,SPECIAL PURPOSE, ELECTRICAL	1
36	XBFD	2815-01-609-1453	92878	TG903-3962	ENGINE ASSEMBLY (SEE FIGURE 7 FOR BREAKDOWN).....	1
37	PAFZZ	5995-01-552-6934	7JYX1	T295145	CABLE ASSEMBLY ,SPECIAL PURPOSE, ELECTRICAL	1
38	PAFZZ	5310-01-552-3984	7JYX1	T270360	NUT,SELF-LOCKING, HEXAGON	3
39	PAFZZ	5310-01-552-2776	7JYX1	T270380	WASHER,FLAT.....	19
40	PAFZZ	5310-01-533-2191	7JYX1	T270381	WASHER,SEAL	3
41	XBFD	5365-01-559-2443	7JYX1	T270945	SPACER,PLATE	3
42	PAFZZ	5307-01-558-7259	47JYX1	TG903-4606	STUD,SHOULDERED	3
43	PAFZZ	2990-01-552-6325	7JYX1	TG903-5003	HEATER,COOLANT, ENGINE.....	1
44	PAFZZ	5920-01-123-5212	7JYX1	TG903-6602	FUSE, ENCLOSED LINK.....	1
45	PAFZZ	5920-01-149-6952	7JYX1	TG903-6603	FUSE, ENCLOSED LINK.....	1
46	PAFZZ	4730-01-492-6678	7JYX1	1000904	CLAMP,HOSE.....	12
47	PAFZZ	4720-01-570-0499	7JYX1	1001120	HOSE,METALLIC	1
48	PAFZZ	4730-01-552-2772	7JYX1	TG903-4012	CLAMP,HOSE	8
49	PAFZZ	4720-01-552-9960	7JYX1	TG903-6706	HOSE, NONMETALLIC	5
50	PAFZZ	4730-01-569-7756	7JYX1	1000924	REDUCER,PIPE	2
51	XBFD		7JYX1	TG903-6705	FUEL LINE,PLASTIC.....	2
52	PAFZZ	2910-01-553-0046	7JYX1	TG903-6501	FILTER ELEMENT,FLUID	1
53	PAFZZ	4730-01-552-6415	7JYX1	TG903-4011	CLAMP,HOSE	1
54	PAFZZ	2910-01-553-0047	7JYX1	TG903-3002	PUMP,FUEL, ELECTRICAL	1
55	PAFZZ	5305-01-552-3987	7JYX1	T270340	SCREW,CAP, HEXAGON HEAD	1
56	PAFZZ	4120-01-568-9442	7JYX1	TG903-3601	HOSE,METALLIC	1
57	PAFZZ	5310-01-523-1028	7JYX1	T270397	WASHER,FLAT	1
58	PAFZZ		7JYX1	TG903-4611	CLAMP,HOSE	4

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
59	PAFZZ	4720-01-570-8936	7JYX1	TG903-6712	FUEL HOSE.....	1
60	PAFZZ	4730-01-552-0695	7JYX1	T230027	NIPPLE,HOSE	5
61	PAFZZ	5970-01-569-6555	7JYX1	TG903-3916	INSULATOR, WASHER	4
62	PAFZZ	5305-01-559-2700	7JYX1	T270343	SCREW,CAP, HEXAGON HEAD	8
63	PAFZZ	5310-01-497-7828	7JYX1	T270350	NUT	8
64	XBFZZ		7JYX1	1003632	TUBE ASSEMBLY,METAL	1
65	XBFZZ		7JYX1	1003631	TUBE ASSEMBLY,METAL	1
66	PAFZZ	4730-00-014-4027	7JYX1	HW903-8020	PLUG,PIPE	1
67	PAFZZ	4810-01-569-5481	7JYX1	TG903-3353	VALVE,BALL.....	1
68	PAFZZ	4730-01-481-4962	7JYX1	HW903-8016	NIPPLE,PIPE	1
69	PAFZZ	6680-00-838-1829	7JYX1	TG903-6553	GAGE,LIQUID QUANTITY, FLOAT TYPE	1
70	PAFZZ		7JYX1	TG430-5001G	TANK,FUEL,ENGINE	1
					UOC: 89W	1
70	PAFZZ		7JYX1	TG430-5001T	TANK,FUEL,ENGINE	1
					UOC: 89X	1
71	PAFZZ	5305-01-569-5454	7JYX1	T270134	SCREW,MACHINE	4
72	PAFZZ	5310-01-569-4411	7JYX1	T270190	WASHER,LOCK	4
73	PAFZZ	4930-01-569-3237	7JYX1	T230020	OIL DRAIN ASSEMBLY	1
74	PAFZZ	4820-01-570-4489	7JYX1	T230019	COOLANT DRAIN ASSEMBLY	1
75	PAFZZ	5340-01-334-5735	7JYX1	5557-9	CAP,FILLER OPENING.....	1
76	XBFZZ		7JYX1	1002734	PANEL,ACCESS	1
					UOC: 89W	
76	XBFZZ		7JYX1	1002735	PANEL,ACCESS	1
					UOC: 89X	
77	PAFZZ	5310-01-569-0373	7JYX1	T270291	WASHER,LOCK	16
78	PAFZZ	4730-01-424-5432	7JYX1	T230060	CLAMP,HOSE	12
79	PAFZZ	4730-01-569-5438	7JYX1	HW903-8008	ELBOW,PIPE	1
80	PAFZZ	4730-00-795-6959	7JYX1	HW903-8007	PLUG,QUICK DISCONNECT	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
81	PAFZZ	5340-01-569-5472	7JYX1	1000588	CAP,PROTECTIVE, DUST AND MOISTURE SEAL	1
82	PAFZZ	4730-00-602-5342	7JYX1	HW903-8003	COUPLING,HALF, QUICK DISCONNECT	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
83	PAFZZ	5340-01-569-5997	7JYX1	1000590	CAP,PROTECTIVE, DUST AND MOISTURE SEAL	1
84	PAFZZ	4730-01-569-4203	7JYX1	HW903-8004	ELBOW, PIPE	1
85	PAFZZ	4730-01-399-1866	7JYX1	T230039	ADAPTER,STRAIGHT, PIPE TO HOSE	1
86	PAFZZ	5340-01-569-5467	7JYX1	PCHA0181	LEVER,MANUAL CONTROL	1
87	PAFZZ	5305-01-569-7937	7JYX1	1002010	SCREW,MACHINE	1
88	PAFZZ	5310-01-552-8314	7JYX1	T270580	WASHER,FLAT	18
89	PAFZZ	5310-01-558-7178	7JYX1	T270590	WASHER,LOCK	2
90	PAFZZ	5305-01-531-7264	7JYX1	HW903-4043	SCREW,CAP, HEXAGON HEAD	2
91	PAFZZ	4730-01-561-5843	7JYX1	T230029	BUSHING,PIPE	4
92	PAFZZ	4730-01-581-3294	7JYX1	T230032	ELBOW,HOSE TO BOSS	7
93	PAFZZ	2910-00-977-5495	7JYX1	TG903-3354	VALVE FUEL	1
94	PAFZZ	4730-01-568-4716	7JYX1	T230066	ADAPTER BUSHING.....	2
95	PAFZZ	5310-01-559-2446	7JYX1	50CNNE1	NUT,SELF-LOCKING, HEXAGON.....	4
96	PAFZZ	5310-01-554-1192	7JYX1	T270885	WASHER,FLAT.....	4
97	PAFZZ	5305-01-553-0414	7JYX1	T270540	SCREW,CAP, HEXAGON HEAD...	8
98	PAFZZ		7JYX1	T220007	MOUNT,RESILIENT, GENERAL PURPOSE.....	4
99	PAFZZ	5305-01-570-2471	7JYX1	T270744	SCREW,CAP, HEXAGONHEAD.....	4
100	PAFZZ	5310-01-558-7184	7JYX1	T270550	NUT,PLAIN, HEXAGON.....	8

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY.
101	PAFZZ	4720-01-570-0575	7JYX1	T230585	HOSE ASSEMBLY, NONMETALLIC.....	1
102	PAFZZ		7JYX1	1002532	FOAM KIT,REPLACEMENT.....	1
103	PAFZZ		7JYX1	T270221	SCREW,MACHINE.....	23
104	PAFZZ		7JYX1	1002533	FOAM KIT,REPLACEMENT.....	1
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
BATTERY INSTALLATION, 1013202

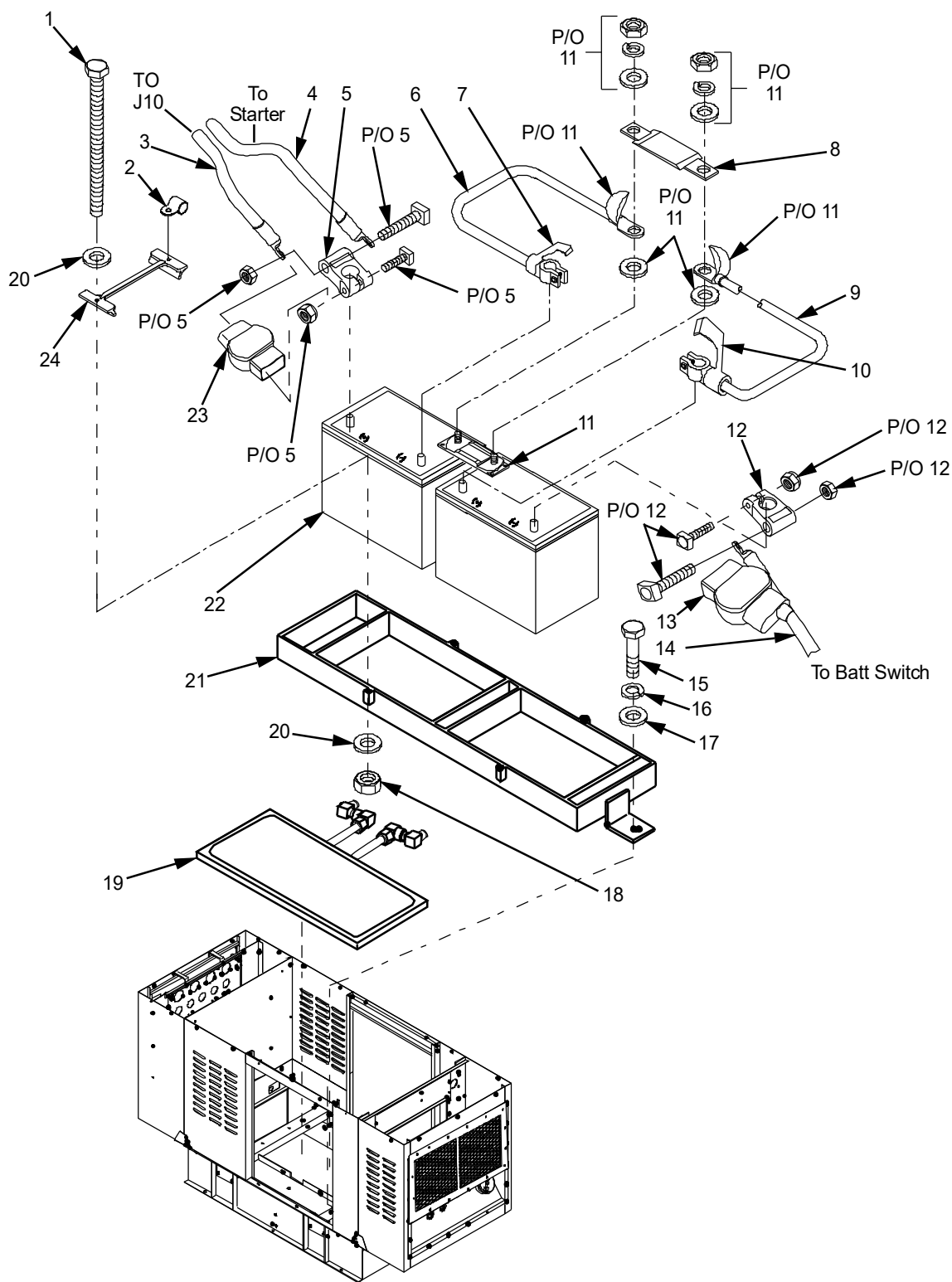


Figure 6. Battery Installation, 1013202.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 0201						
FIGURE 6. BATTERY INSTALLATION 1013202						
1	PAFZZ	5305-01-606-8639	7JYX1	HW903-3004	SCREW,CAP,HEXAGON HEAD.....	4
2	PAFZZ	5340-01-476-4955	7JYX1	T270954	CLAMP,LOOM.....	2
3	PAFZZ	6150-01-552-6221	7JYX1	T233851	LEAD,STORAGE,BATTERY..	1
4	PAFZZ	6150-01-589-5160	7JYX1	T233865	LEAD,STORAGE,BATTERY..	1
5	PAFZZ	5940-01-338-1965	7JYX1	1008570	TERMINAL LUG	1
6	PAFZZ	6150-01-581-6751	7JYX1	1004865	LEAD,STORAGE,BATTERY..	1
7	PAFZZ	5940-01-552-9497	7JYX1	T260786	COVER,TERMINAL.....	1
8	PAFZZ	5920-01-581-6939	7JYX1	TG903-6605	FUSE,LINK,ELECTRICAL.....	1
9	PAFZZ	6150-01-581-6746	7JYX1	1004864	LEAD,STORAGE,BATTERY..	1
10	PAFZZ	5940-01-581-6740	7JYX1	T260785	COVER,TERMINAL.....	1
11	PAFZZ	5920-01-581-6929	7JYX1	TG903-6604	FUSEHOLDER BLOCK.....	1
12	PAFZZ	5940-01-337-3316	7JYX1	1008571	TERMINAL LUG	1
13	PAFZZ		7JYX1	1009409	COVER,TERMINAL.....	1
14	PAFZZ	6150-01-553-0934	7JYX1	T233880	LEAD,STORAGE,BATTERY..	1
15	PAFZZ	5305-01-553-0414	7JYX1	T270540	SCREW,CAP,HEXAGON HEAD.....	2
16	PAFZZ	5310-01-590-5654	7JYX1	T270590	WASHER,LOCK	2
17	PAFZZ	5310-01-503-8765	7JYX1	T270580	WASHER,FLAT	2
18	PAFZZ	5310-01-563-4714	7JYX1	T270360	NUT,SELF-LOCKING, HEXAGON.....	4
19	XBFZZ	6160-01-580-4310	7JYX1	T230531	TRAY,BATTERY	1
20	PAFZZ	5310-01-552-2776	7JYX1	T270380	WASHER,FLAT	8
21	XBFZZ		7JYX1	T220076	TRAY,MOUNTING	1
22	PAFZZ		7JYX1	1004860	BATTERY,STORAGE	2
23	PAFZZ		7JYX1	1009410	COVER,TERMINAL.....	1
24	PAFZZ		7JYX1	T220081	RETAINER,BATTERY.....	2
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
ENGINE-GENERATOR ASSEMBLY, 1013012

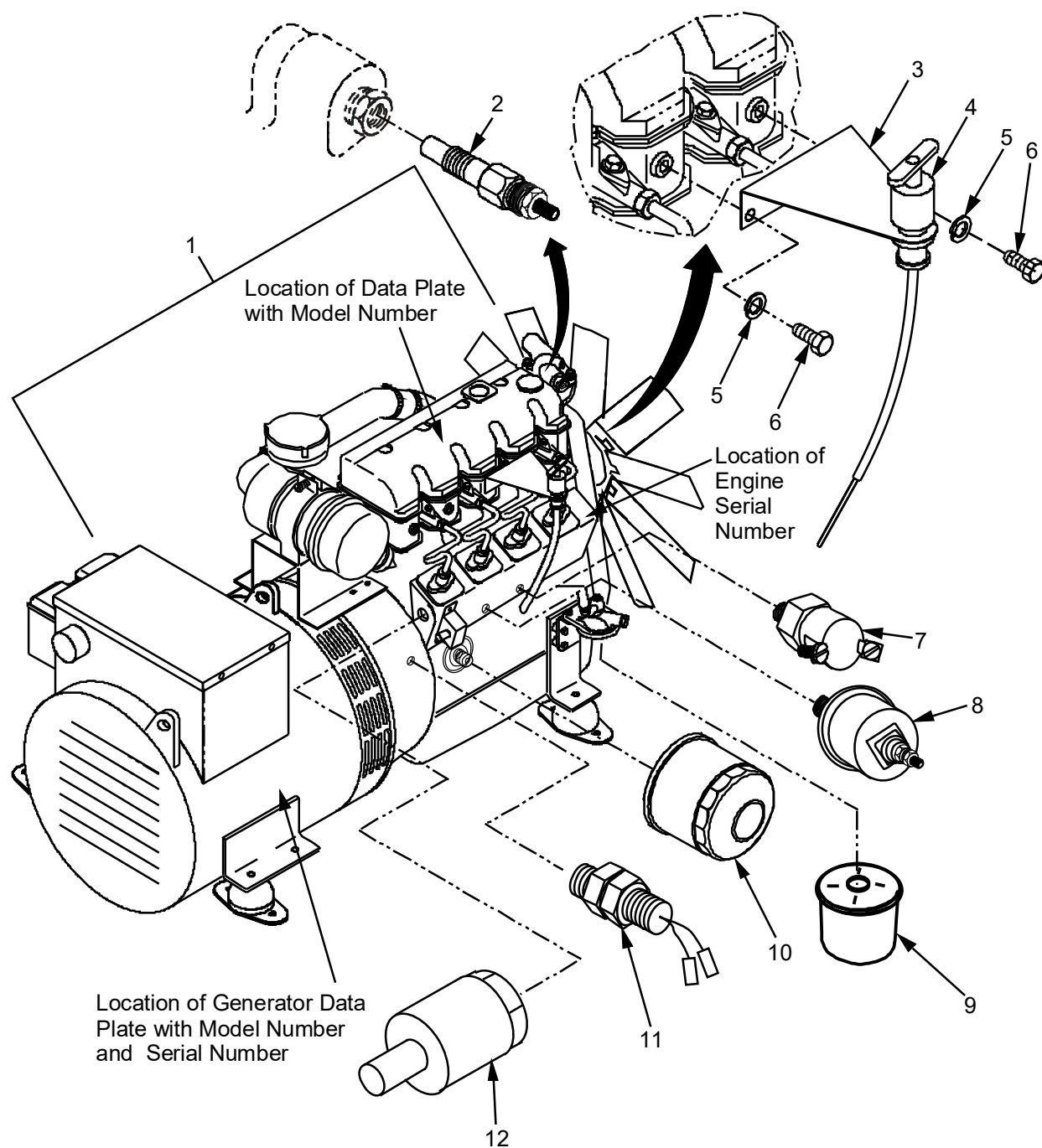


Figure 7. Engine-Generator Assembly 1013012 (Sheet 1 of 7).

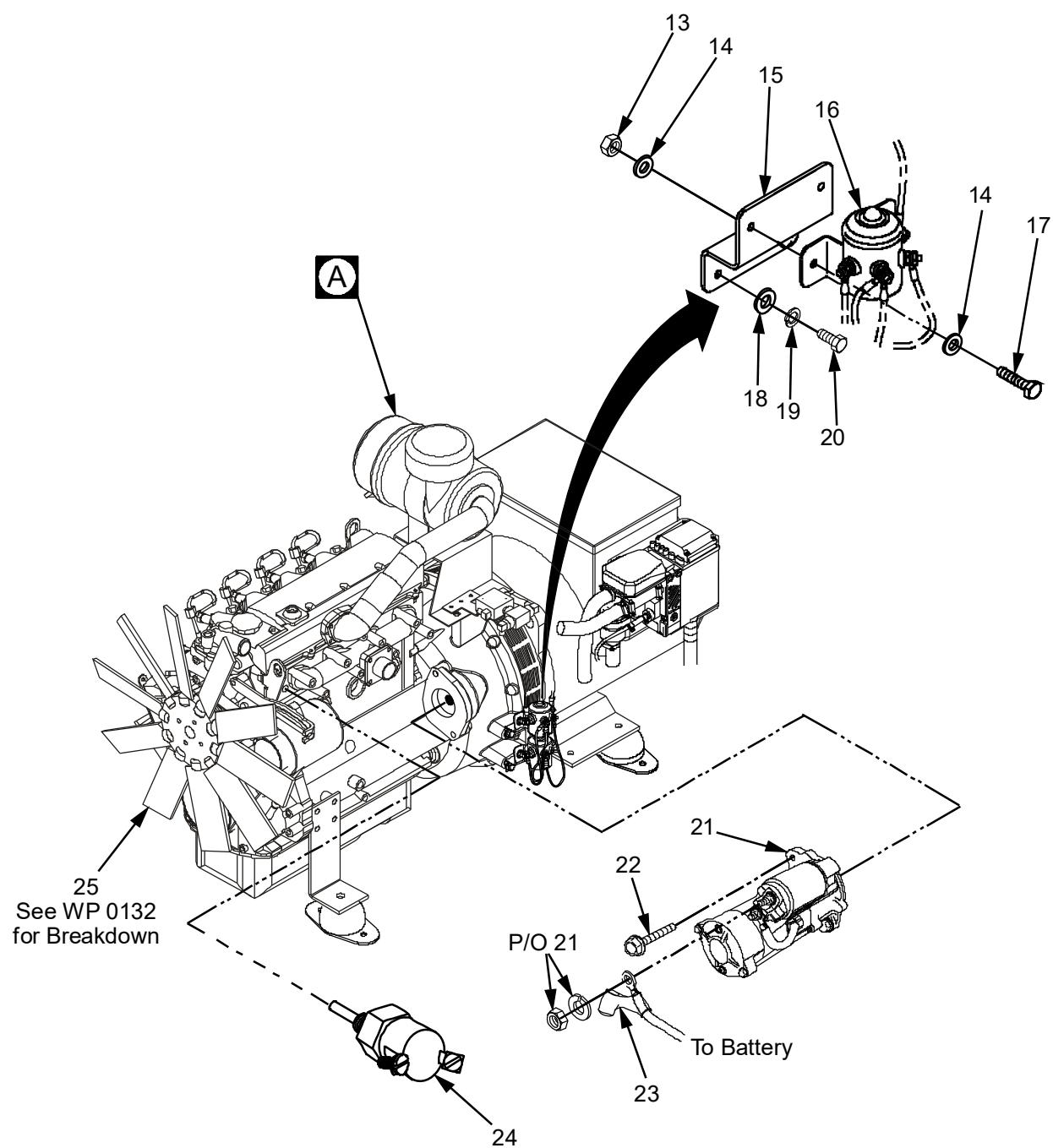


Figure 7. Engine-Generator Assembly 1013012 (Sheet 2 of 7).

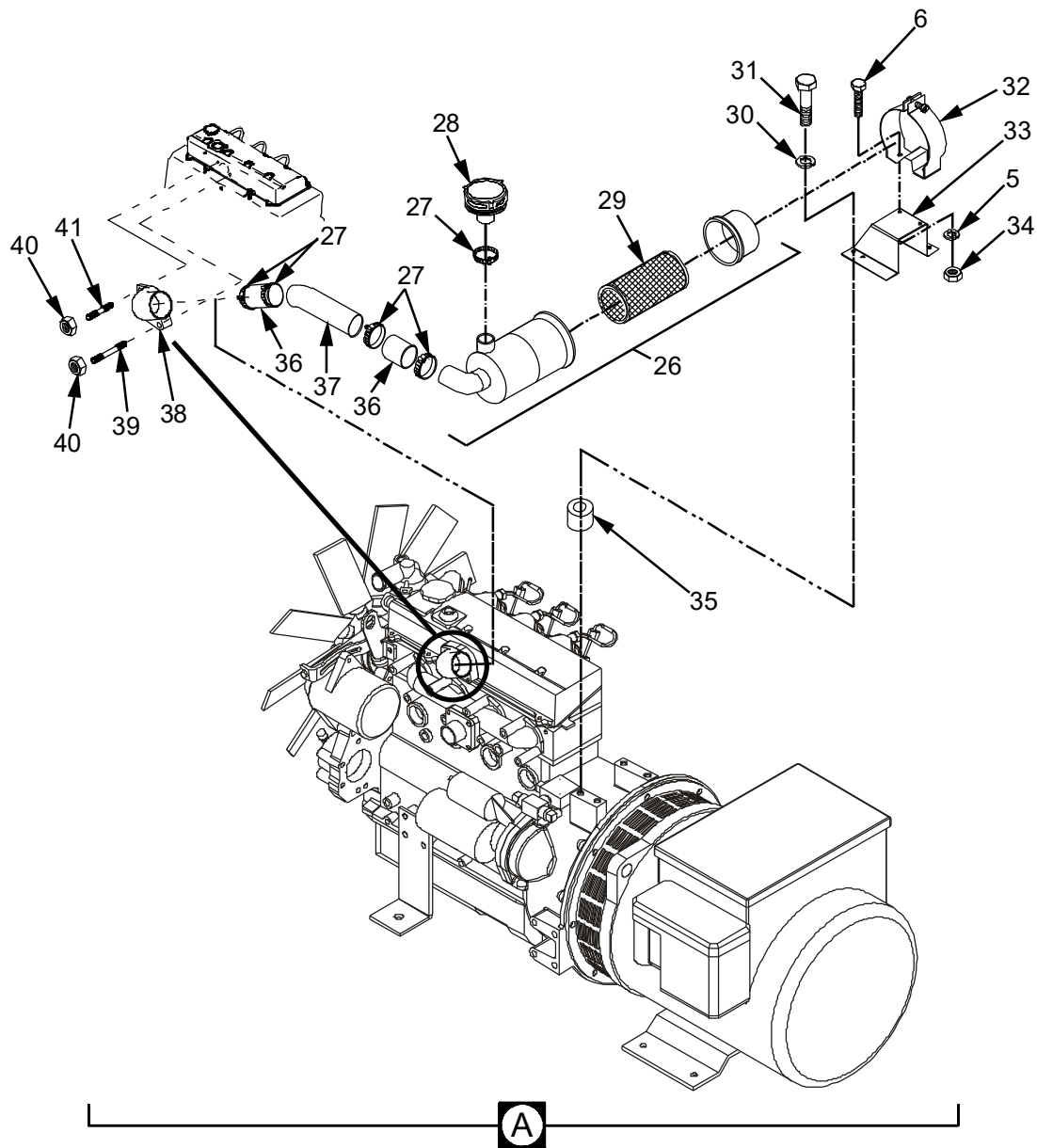


Figure 7. Engine-Generator Assembly 1013012 (Sheet 3 of 7).

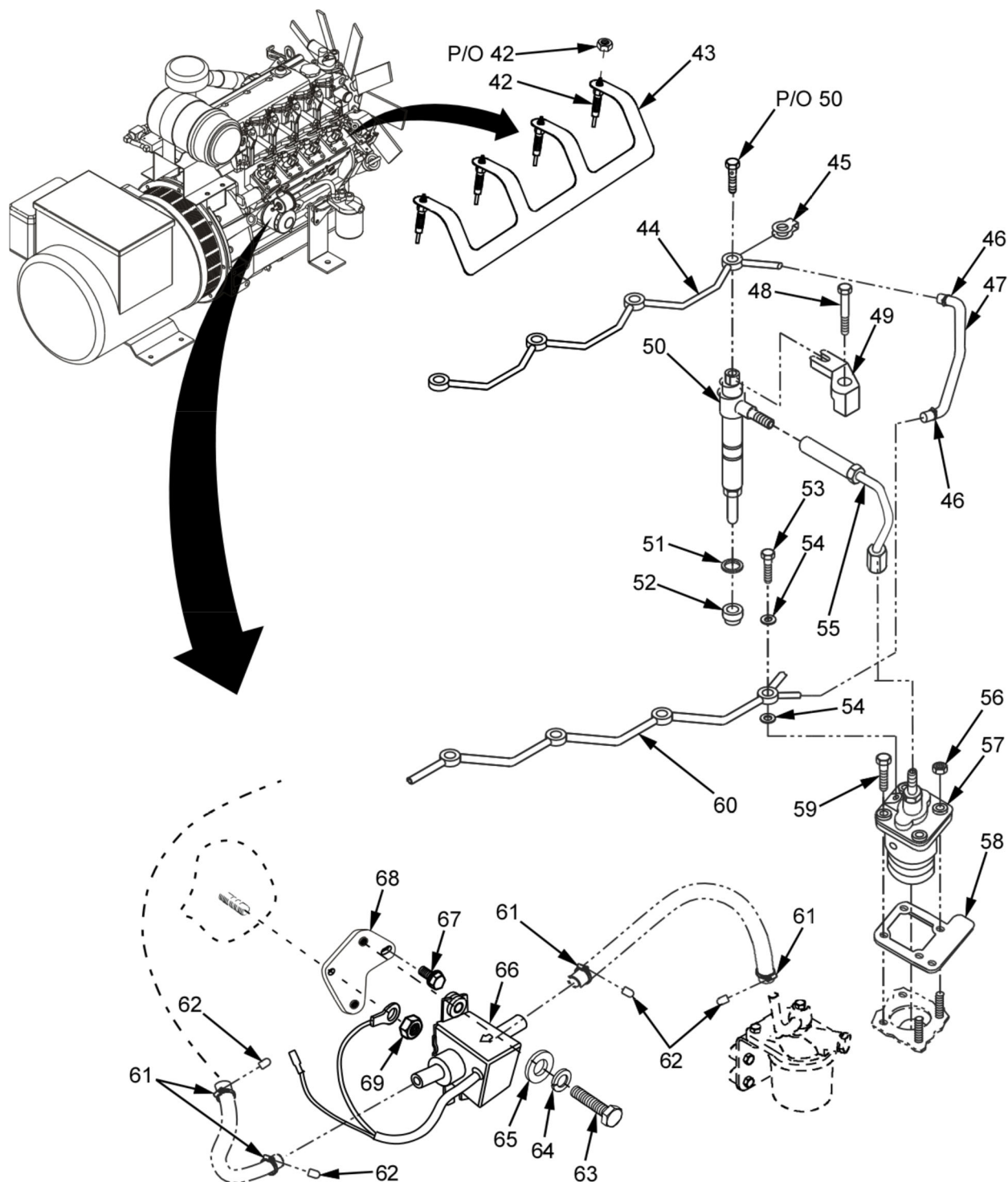


Figure 7. Engine-Generator Assembly 1013012 (Sheet 4 of 7).

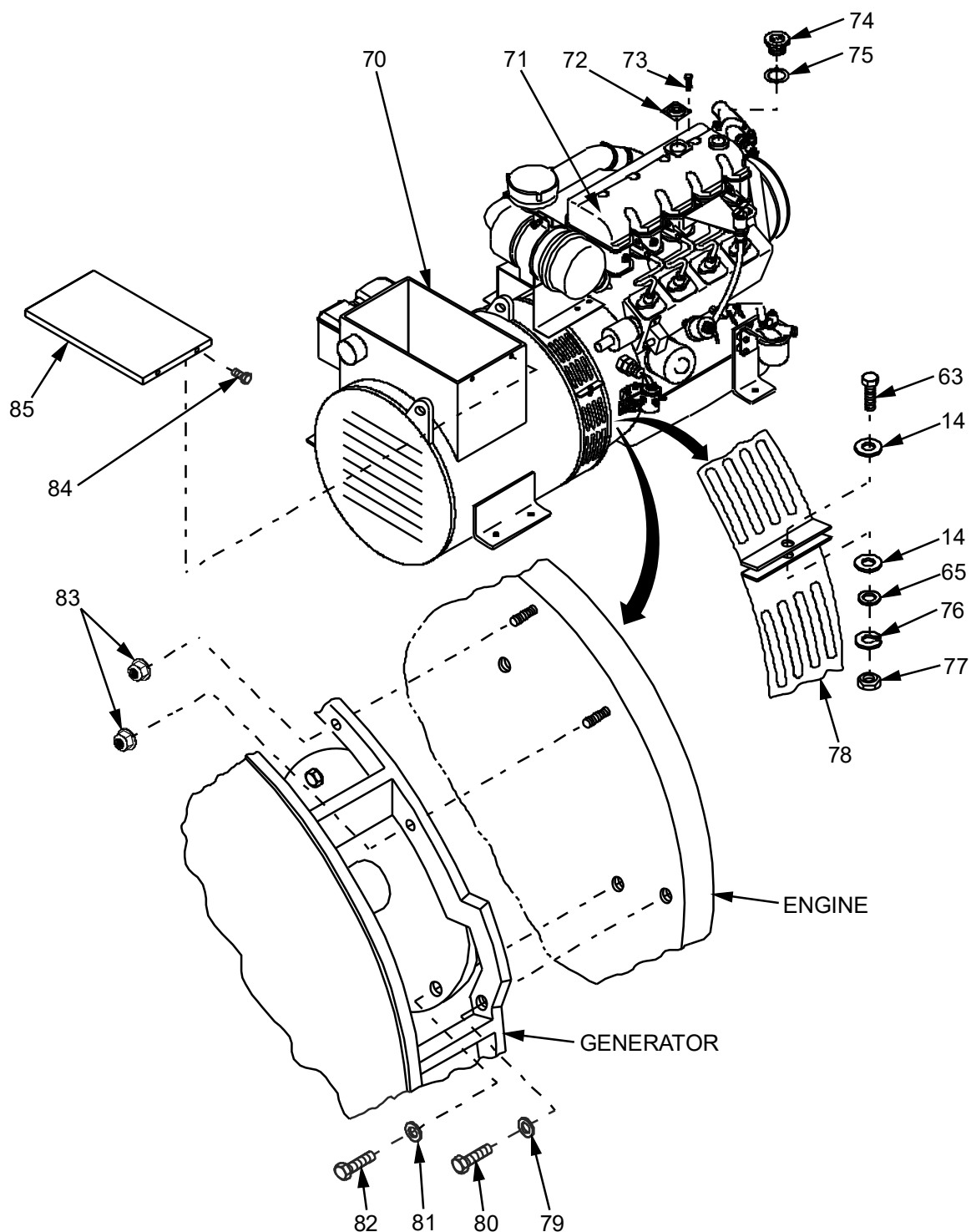


Figure 7. Engine-Generator Assembly 1013012 (Sheet 5 of 7).

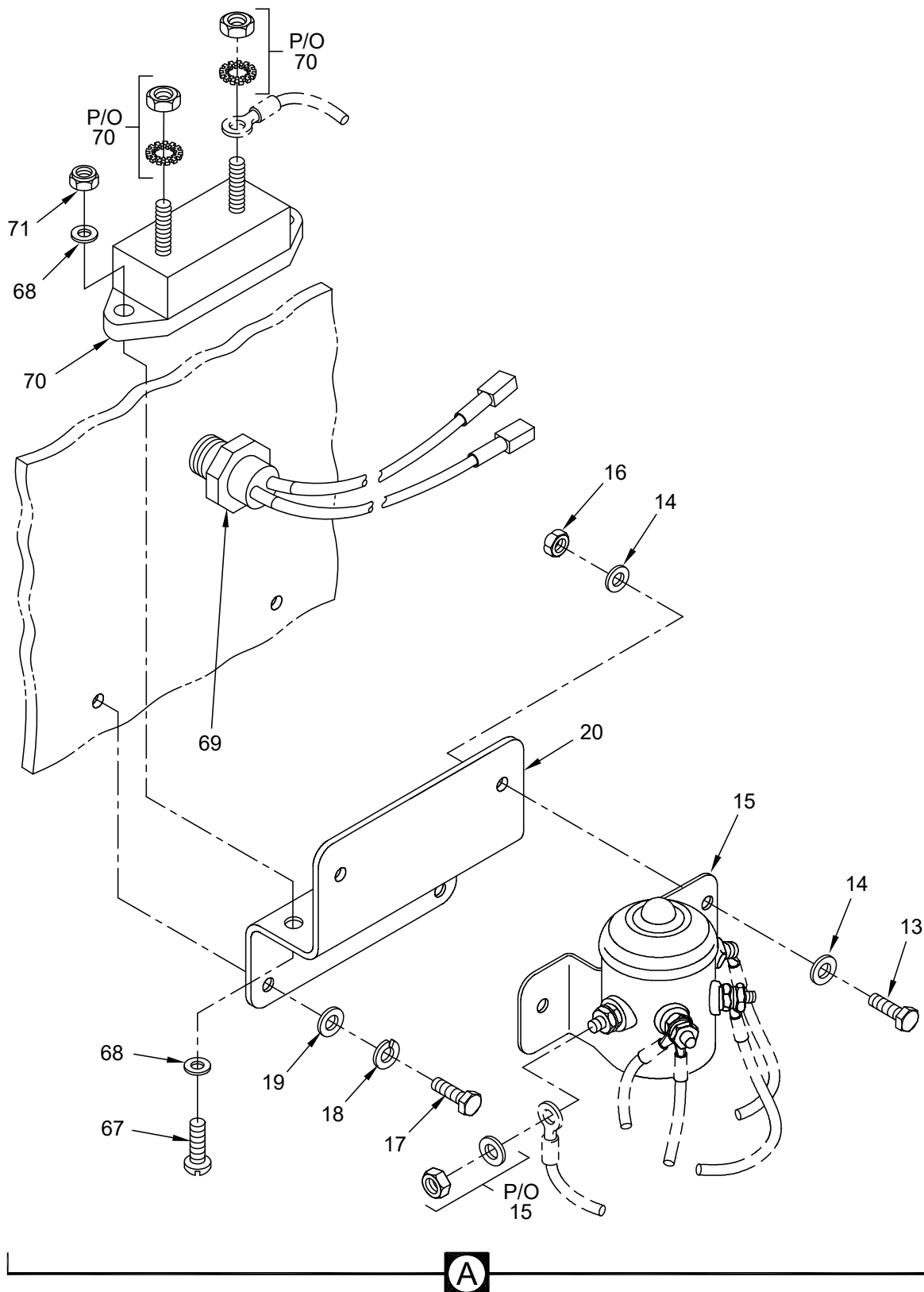


Figure 7. Engine-Generator Assembly 1013012 (Sheet 6 of 7).

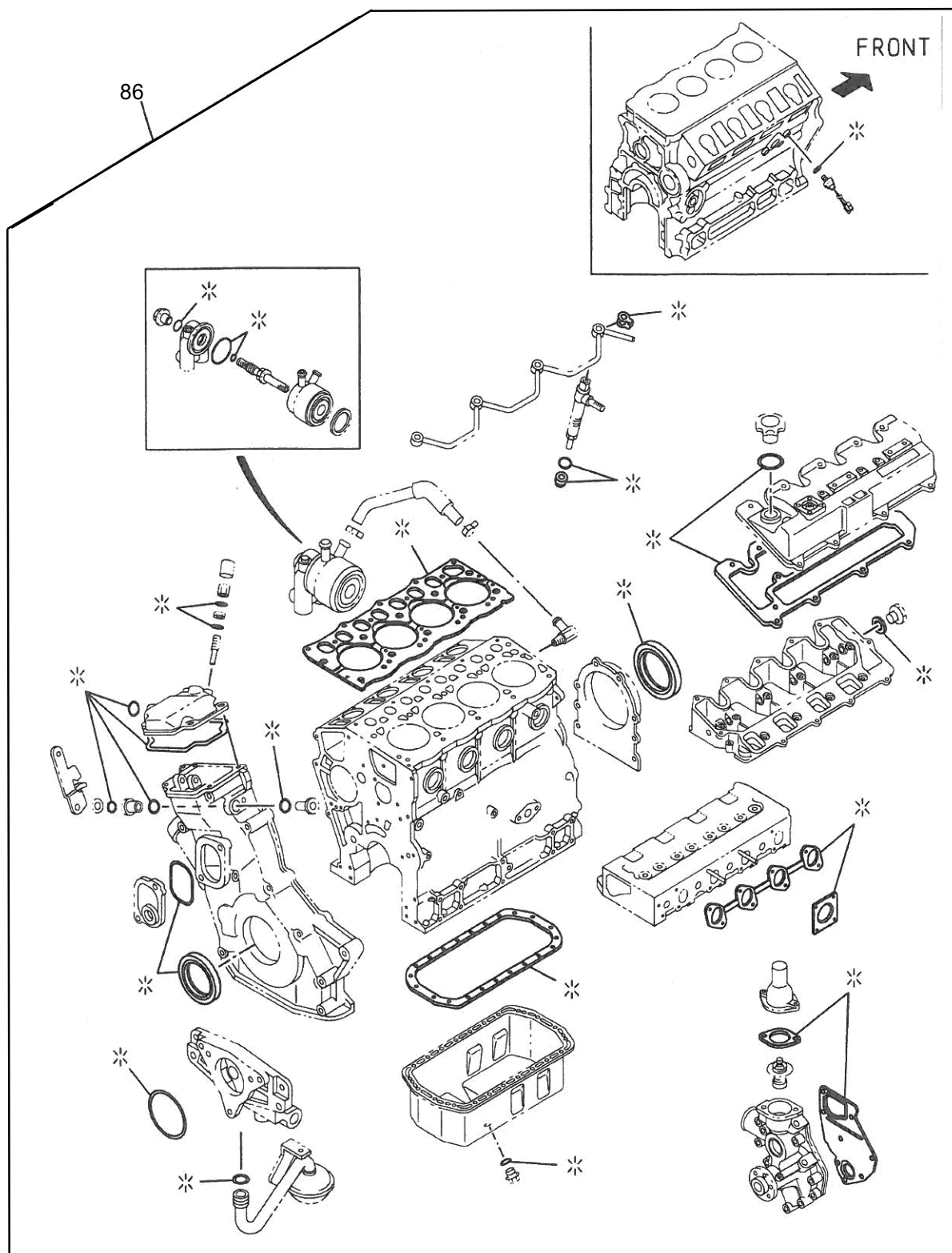


Figure 7. Engine-Generator Assembly 1013012 (Sheet 6 of 7).

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 0202						
FIGURE 7. ENGINE-GENERATOR ASSEMBLY 1013012						
1	XBFZZ		7JYX1	1006230	GENSET,18KW,ISUZU/ MARATHON GENERATOR,24V,TIER4A....	1
2	PAFZZ	6685-01-553-1307	7JYX1	T230002	TRANSMITTER, TEMPERATURE, ELECTRICAL RESISTANCE .	1
3	XBFZZ		7JYX1	1000566	BRACKET,MOUNTING.....	1
4	PAFZZ		7JYX1	TG903-3946	FILLER NECK,LIQUID	1
5	PAFZZ	5310-01-553-0365	7JYX1	1000117	WASHER,LOCK.....	4
6	PAFZZ	5305-01-579-6627	7JYX1	HW903-4010	SCREW,CAP,HEXAGON HEAD.....	4
7	PAFZZ	5930-01-553-5296	7JYX1	T230003	SWITCH,PRESSURE	1
8	PAFZZ	6620-01-553-4096	7JYX1	T230001	TRANSMITTER PRESSURE.	1
9	PAFZZ	2910-01-552-9726	7JYX1	T11003P	FILTER ELEMENT,FLUID,(FUEL)	1
10	PAFZZ	2940-01-552-6301	7JYX1	T11004P	FILTER ELEMENT,FLUID,(OIL).....	1
11	PAFZZ	2815-01-552-9950	7JYX1	T255201	SPEED SENSOR,DIESEL	1
12	PAFZZ	5945-01-552-1084	7JYX1	T17016P	ELECTROMAGNETIC ACTUATOR.....	1
13A	PAFZZ	5305-01-553-0350	7JYX1	T270339	SCREW,CAP,HEXAGON HEAD.....	6
14A	PAFZZ	5310-01-552-2776	7JYX1	T270380	WASHER,FLAT	13
15A	PAFZZ	5945-01-553-3177	7JYX1	T230005	SOLENOID,ELECTRICAL	3
16A	PAFZZ	5310-01-552-3984	7JYX1	T270360	NUT, SELF-LOCKING, HEXAGON	6
17A	PAFZZ	5305-01-559-4711	7JYX1	T270539	SCREW,CAP,HEXAGON HEAD.....	6
18A	PAFZZ	5310-01-558-7178	7JYX1	T270590	WASHER,LOCK.....	6
19A	PAFZZ	5310-01-552-8314	7JYX1	T270580	WASHER,FLAT	6
20A	XBFZZ		7JYX1	T230007	BRACKET, DOUBLE-ANGLE..	3
13	PAFZZ	5310-01-602-4140	7JYX1	1005375	NUT,SELF-LOCKING, HEXAGON.....	6
14	PAFZZ	5310-01-552-2776	7JYX1	T270380	WASHER,FLAT	13
15	XBFZZ		7JYX1	T230007	BRACKET, DOUBLE-ANGLE	2
16	PAFZZ	5945-01-553-3177	7JYX1	T230005	SOLENOID,ELECTRICAL	2

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
17	PAFZZ	5305-01-553-0350	7JYX1	T270339	SCREW,CAP,HEXAGON HEAD.....	6
18	PAFZZ	5310-01-503-8765	7JYX1	T270580	WASHER,FLAT.....	6
19	PAFZZ	5310-01-558-7178	7JYX1	T270590	WASHER,LOCK.....	6
20	PAFZZ	5305-01-559-4711	7JYX1	T270539	SCREW,CAP,HEXAGON HEAD.....	6
21	PAFZZ	2920-01-552-6314	7JYX1	TG903-3923	STARTER,ENGINE, ELECTRICAL	1
22	PAFZZ	5306-01-552-8662	7JYX1	HW903-4021	BOLT,MACHINE	2
23	PAFZZ		7JYX1	TG903-5701	COVER,TERMINAL	1
24	PAFZZ	5930-01-553-4145	7JYX1	T230004	SWITCH,THERMOSTATIC....	1
25	XCFFF		7JYX1	1013204	COOLING SYSTEM INSTALLATION (SEE FIGURE 8 FOR BREAKDOWN).....	1
26	XBFZZ	2940-01-584-3314	7JYX1	TG903-6502	FILTER BODY,INTAKE AIR CLEANER.....	1
27	PAFZZ	4730-01-552-9598	7JYX1	TG903-4600	CLAMP, HOSE.....	5
28	XBFZZ	2940-01-553-1319	7JYX1	TG903-3210	AIR CLEANER, INTAKE	1
29	PAFZZ	4310-01-466-8495	7JYX1	T11001P	FILTER,ELEMENT,INTAKE AIR CLEANER.....	1
30	PAFZZ	5310-01-552-3971	7JYX1	HW903-6003	WASHER,LOCK.....	4
31	PAFZZ	5306-01-552-4514	7JYX1	HW903-4011	BOLT,MACHINE	4
32	XBFZZ		7JYX1	TG903-3502	BRACKET,SUPPORT	1
33	XBFZZ		7JYX1	TG903-3503	BRACKET,MOUNTING.....	1
34	PAFZZ	5310-01-552-8308	7JYX1	1006293	NUT,PLAIN,EXTENDED WASHER,HEXAGON.....	2
35	XBFZZ		7JYX1	TG903-4008	SPACER.....	4
36	XBFZZ		7JYX1	TG903-6708	EXTENSION,FLEXIBLE.....	2
37	XBFZZ		7JYX1	TG903-3603	TUBE,INTAKE.....	1
38	XBFZZ		7JYX1	1009991	PIPE,ELBOW	1
39	PAFZZ	5307-01-606-8697	7JYX1	1009992	STUD,COTINUOS THREAD..	1
40	PAFZZ	5310-01-570-5969	7JYX1	1009988	NUT,BLANK	2
41	PAFZZ	5307-01-606-8560	7JYX1	1009993	STUD,CONTINUOUS THREAD	1
42	PAFZZ	2920-01-552-6309	7JYX1	T230412	GLOW,PLUG.....	4
43	XBFZZ		7JYX1	TG903-3913	CONNECTOR STRIP	1
44	PAFZZ		7JYX1	1001395	TUBE ASSEMBLY,METAL	1
45	PAFZZ	5330-01-569-0386	7JYX1	TG903-4715	GASKET	4
46	PAFZZ	5340-01-547-8512	7JYX1	1001391	CLIP,RETAINING.....	2
47	PAFZZ		7JYX1	1001396	HOSE,RUBBER	1
48	PAFZZ	5306-01-569-7926	7JYX1	1001394	CAP,SCREW,HEXAGON HEAD.....	1
49	XBFZZ		7JYX1	1001392	BRACKET,MOUNTING.....	4
50	PAFZZ	2910-01-569-0390	7JYX1	TG903-6724	INJECTOR ASSEMBLY, FUEL	4

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
51	PAFZZ	5330-01-569-0380	7JYX1	TG903-4714	O-RING	4
52	PAFZZ	5330-01-569-0369	7JYX1	TG903-4716	GASKET	4
53	PAFZZ	5306-01-547-8487	7JYX1	1000582	BOLT,EYE	4
54	PAFZZ		7JYX1	1009980	GASKET	8
55	PAFZZ		7JYX1	1009981	TUBE ASSEMBLY,METAL	4
56	PAFZZ	5310-01-570-5993	7JYX1	HW903-5000	NUT,PLAIN,HEXAGON	8
57	PAFZZ		7JYX1	1009982	PUMP,INJECTION	4
58	PAFZZ	5365-01-569-7918	7JYX1	HW903-9006	SHIM	4
59	PAFZZ	5306-01-547-8472	7JYX1	HW903-4016	BOLT,MACHINE	8
60	PAFZZ	4710-01-606-4758	7JYX1	1000883	TUBE ASSEMBLY,METAL	1
61	PAFZZ	4730-01-569-0826	7JYX1	TG903-4625	CLAMP,HOSE	4
62	PAFZZ		7JYX1	1001389	COVER,PROTECTIVE	4
63	PAFZZ	5305-01-554-5224	7JYX1	1005985	SCREW,CAP,HEXAGON HEAD	3
64	PAFZZ	5310-01-553-6196	7JYX1	1009986	WASHER,LOCK	2
65	PAFZZ		7JYX1	1005984	WASHER,FLAT	3
66	PAFZZ	2910-01-553-1272	7JYX1	T230208	PUMP,FUEL,ELECTRICAL ...	1
67A	PAFZZ	5305-01-569-1803	7JYX1	T270129	SCREW,MACHINE	2
68A	PAFZZ	5310-01-553-0370	7JYX1	T270180	WASHER,FLAT	4
69A	PAFZZ	2815-01-552-9950	7JYX1	T255201	SPEED SENSOR,DIESEL	1
70A	PAFZZ	5925-01-569-0250	7JYX1	T230590	CIRCUIT BREAKER	1
71A	PAFZZ	5310-01-569-2130	7JYX1	T270160	NUT,SELF-LOCKING HEXAGON	2
67	PAFZZ	5306-01-570-6401	7JYX1	1005601	BOLT,FLANGE	1
68	PAFZZ		7JYX1	1009987	BRACKET,MOUNTING	1
69	PAFZZ	5310-01-570-5969	7JYX1	1009988	NUT,W/LOCK WASHER	1
70	PAFDD	6115-01-606-8160	7JYX1	T240200	GENERATOR SET,DIESEL ENGINE	1
71	PAFDD	2815-01-609-1453	7JYX1	1003509	ENGINE,DIESEL (NO GEN) ..	1
72	PAFZZ	2990-01-609-2296	7JYX1	1009983	BREATHER FILTER, EMISSION CONTROL	1
73	PAOZZ	5305-01-606-8566	7JYX1	1009984	SCREW,SELF-LOCKING	4
74	PAFDD	2590-01-450-6882	7JYX1	TG903-3011	CAP,FILLER	1
75	PAFZZ	5330-01-609-9951	7JYX1	1004927	GASKET,OIL FILL	1
76	PAFZZ	5310-01-595-6563	7JYX1	T270390	WASHER,LOCK	1
77	PAFZZ	5310-01-572-6753	7JYX1	1000730	NUT,PLAIN,HEXAGON	1
78	XBFZZ	6115-01-577-7123	7JYX1	1003304	GUARD,FAN IMPELLER	1
79	PAFZZ	5310-01-569-0412	7JYX1	1003306	WASHER,FLAT	8
80	PAFZZ	5305-01-569-0843	7JYX1	1003362	SCREW,CAP,HEXAGON HEAD	6
81	PAFZZ	5310-01-569-0415	7JYX1	1003307	WASHER,FLAT	8
82	PAFZZ	5305-01-569-0831	7JYX1	1003309	SCREW,CAP,HEXAGON HEAD	8
83	PAFZZ	5310-01-570-6476	7JYX1	HW903-5001	NUT,PLAIN,HEXAGON	2
84	PAFZZ	5306-01-569-1824	7JYX1	1003560	BOLT,MACHINE	4
85	XBFZZ		7JYX1	1003559	COVER,ACCESS	1

TM: 1006310

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(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
86	XBFZZ			1009985	KIT,ENGINE OVERHAUL (GASKET AND SEAL).	1
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
COOLING SYSTEM INSTALLATION, 1012404

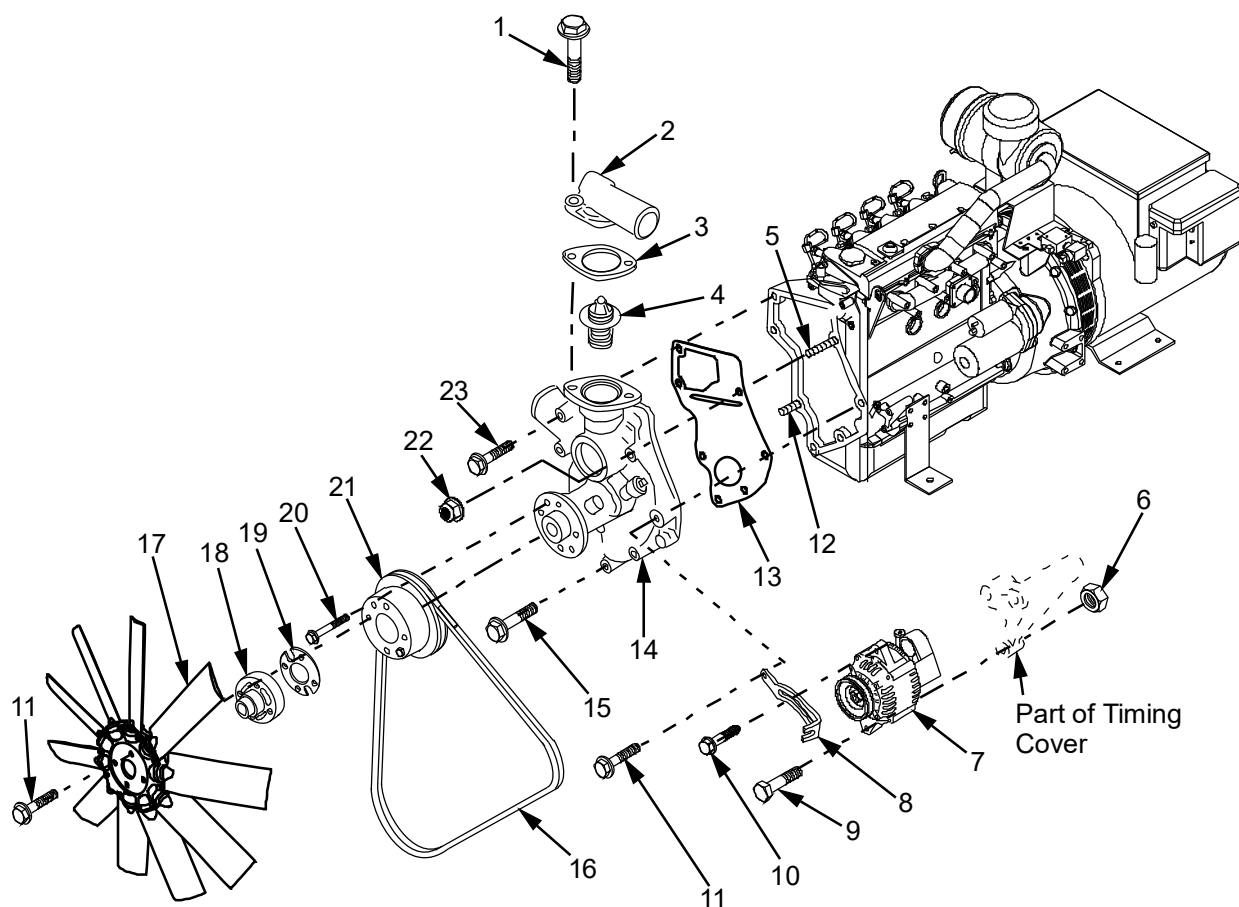


Figure 8. Cooling System Installation, 1012404.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 0203						
FIGURE 8. COOLING SYSTEM INSTALLATION, 1012404						
1	PAFZZ	5306-01-552-8656	7JYX1	HW903-4000	BOLT,MACHINE.....	2
2	XBFZZ	4710-01-548-4353	7JYX1	T230012	PIPE,METALIC	1
3	PAFZZ	5330-01-552-4522	7JYX1	PENG1171	GASKET	1
4	PAFZZ	6685-01-553-1277	7JYX1	PENG1145	THERMOSTAT,FLOW CONTROL	1
5	PAFZZ		7JYX1	1010017	STUD,CONTINUOUS THREAD	1
6	PAOZZ	5310-01-570-6476	7JYX1	HW903-5001	NUT,PLAIN,HEXAGON.....	1
7	PAOZZ	2920-01-553-0314	7JYX1	TG903-3906	GENERATOR,ENGINE ACCESSORY	1
8	XBOZZ	5340-01-548-4360	7JYX1	TG903-3907	BRACKET,MOUNTING	1
9	PAOZZ	5306-01-552-8738	7JYX1	HW903-4006	BOLT,MACHINE.....	1
10	PAOZZ	5306-01-547-8472	7JYX1	HW903-4016	BOLT,MACHINE.....	1
11	PAFZZ	5306-01-606-8564	7JYX1	HW903-4005	BOLT,MACHINE.....	5
12	PAFZZ		7JYX1	1010018	STUD,CONTINUOUS THREAD	1
13	PAFZZ	5330-01-552-9907	7JYX1	PENG1144	GASKET	1
14	PAFZZ	2930-01-553-4605	7JYX1	1009990	PUMP,COOLING SYSTEM,ENGINE	1
15	PAFZZ	5306-01-552-8639	7JYX1	HW903-4002	BOLT,MACHINE.....	2
16	PAFZZ	3030-01-552-5720	7JYX1	T11002P-1	BELT,V	1
17	XBFZZ		7JYX1	TG903-3910	IMPELLER,FAN,AXIAL	1
18	XBFZZ	5365-01-548-4408	7JYX1	TG903-3905	SPACER,SLEEVE.....	1
19	XBFZZ	5365-01-548-4417	7JYX1	1009989	SPACER,SLEEVE.....	1
20	PAFZZ	5306-01-570-6401	7JYX1	1005601	BOLT,MACHINE.....	2
21	XBFZZ	3020-01-548-4404	7JYX1	TG903-3903	PULLEY,GROOVE	1
22	PAFZZ	5310-01-570-5993	7JYX1	HW903-5000	NUT,PLAIN,ROUND.....	2
23	PAFZZ		7JYX1	1005595	BOLT,MACHINE.....	2
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
RADIATOR INSTALLATION 1013205

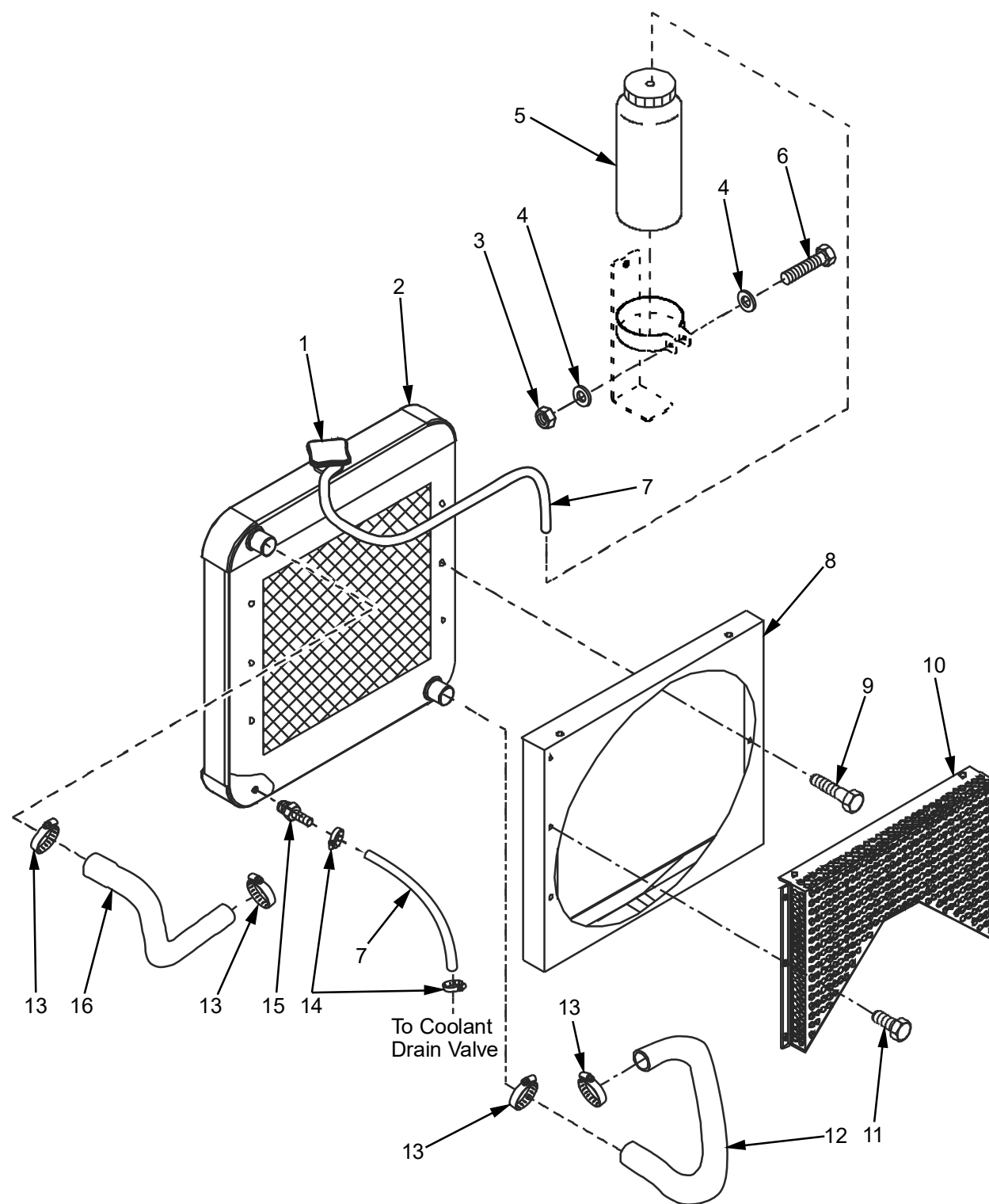


Figure 9. Radiator Installation 1013205.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 0204						
FIGURE 9. RADIATOR INSTALLATION 1013205						
1	PAFZZ	2930-01-552-6338	7JYX1	TG903-3204	CAP,FILLER OPENING	1
2	XBFZZ		7JYX1	T230221	RADIATOR	1
3	PAFZZ	5310-01-602-4140	7JYX1	1005375	NUT,SELF-LOCKING, HEXAGON	1
4	PAFZZ	5310-01-552-2776	7JYX1	T270380	WASHER,FLAT	2
5	XBFZZ		7JYX1	T220086	BOTTLE,OVERFLOW	1
6	PAFZZ	5305-01-552-9209	7JYX1	T270345	SCREW,CAP, HEXAGON HEAD	1
7	XBFZZ		7JYX1	T230054	HOSE,DRAIN	2
8	XBFZZ		7JYX1	TG903-3912	SHROUD,ENGINE FAN	1
9	PAFZZ	5306-01-521-5240	7JYX1	HW903-3014	BOLT,MACHINE.....	6
10	XBFZZ		7JYX1	1012199	GUARD,FAN.....	1
11	PAFZZ	5305-01-559-0882	7JYX1	HW903-3013	SCREW,CAP, HEXAGON HEAD	8
12	PAFZZ		7JYX1	TG903-6717	HOSE,PREFORMED (LOWER)	1
13	PAFZZ	4730-01-479-1934	7JYX1	T230062	CLAMP,HOSE	4
14	PAFZZ	4730-01-424-5432	7JYX1	T230060	CLAMP,HOSE	2
15	PAFZZ	4730-01-580-5730	7JYX1	HW903-8027	ADAPTER,STRAIGHT, PIPE TO HOSE.....	1
16	PAFZZ	4720-01-553-0305	7JYX1	TG903-6716	HOSE,PERFORMED (UPPER)	1
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
EXHAUST SYSTEM INSTALLATION, 1013206

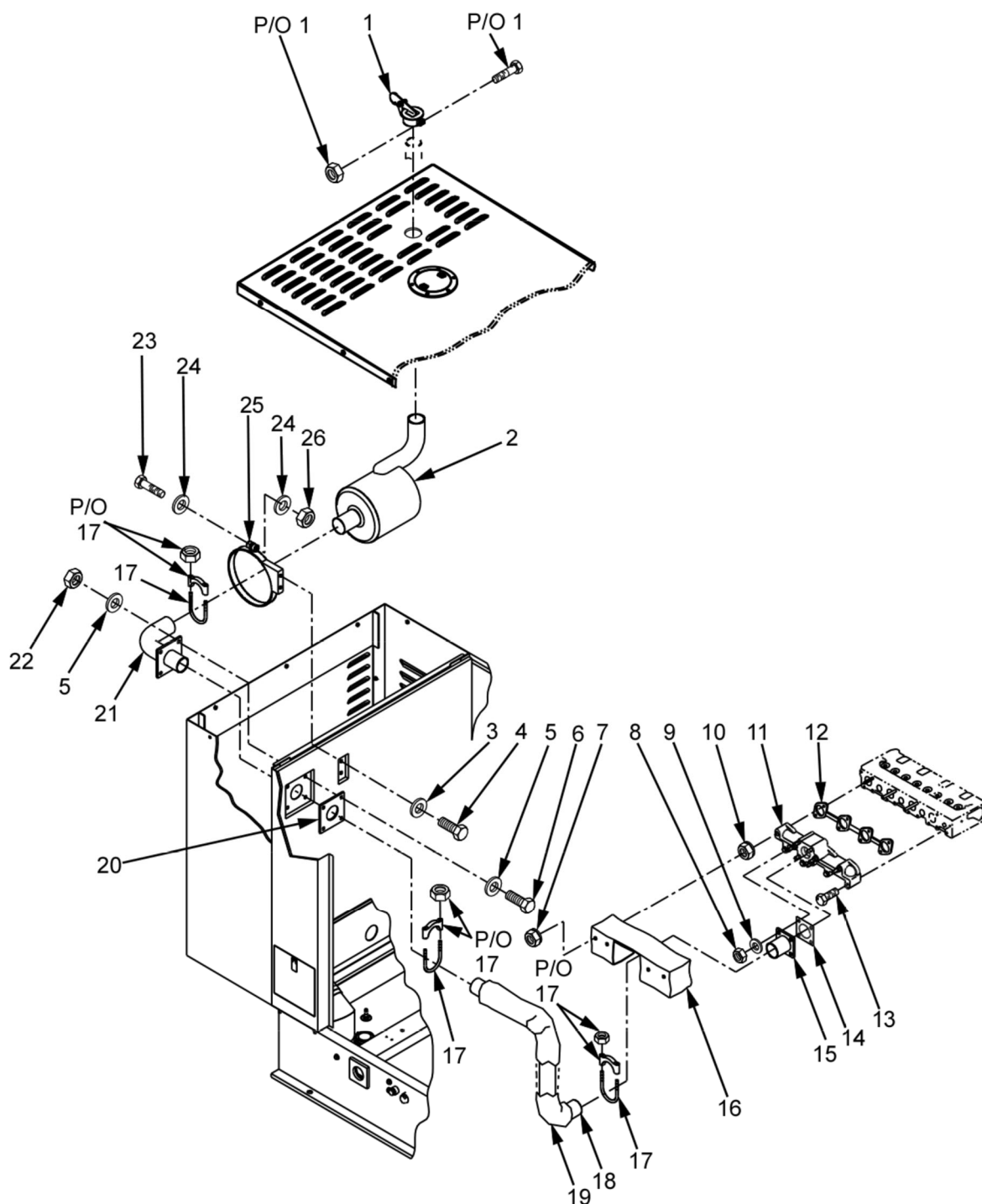


Figure 10. Exhaust System Installation, T235005.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODES (UOC)	(7) QTY
GROUP 0205						
FIGURE 10. EXHAUST SYSTEM INSTALLATION 1013206						
1	XBFZZ	2990-01-219-1590	7JYX1	T231525	CAP,ASSEMBLY, PROTECTIVE,MUFFLER- EXHAUST PIPE	1
2	PAFZZ	2990-01-553-0029	7JYX1	TG903-3801	MUFFLER,EXHAUST	1
3	PAFZZ	5310-01-558-7227	7JYX1	T270480	WASHER,FLAT	2
4	PAFZZ	5305-01-553-0377	7JYX1	T270910	SCREW,CAP HEXAGON HEAD	2
5	PAFZZ	5310-01-552-2776	7JYX1	T270380	WASHER,FLAT	8
6	PAFZZ	5306-01-535-6495	7JYX1	T270340	SCREW,CAP HEXAGON HEAD	4
7	PAFZZ	5310-01-552-4536	7JYX1	T270496	PUSH ON NUT	4
8	PAFZZ	5310-01-553-2165	7JYX1	1006293	NUT,PLAIN,HEXAGON	4
9	PAFZZ	5310-01-553-0365	7JYX1	1003947	WASHER,LOCK	4
10	PAFZZ	5310-01-548-4288	7JYX1	HW903-5000	NUT,PLAIN,EXTENDED WASHER,HEXAGON	4
11	XBFZZ	2815-01-548-4249	7JYX1	1001121	MANIFOLD,EXHAUST	1
12	PAFZZ	5330-01-480-0820	7JYX1	1001122	GASKET	1
13	PAFZZ	5306-01-547-7741	7JYX1	1001123	BOLT,SHOULDER	4
14	PAFZZ	5330-01-547-8616	7JYX1	TG903-3604	GASKET	1
15	XBFZZ		7JYX1	TG903-3607	FLANGE,EXHAUST	1
16	XBFZZ		7JYX1	T231250	BLANKET,EXHAUST	1
17	PAFZZ	5340-01-552-9135	7JYX1	T231512	CLAMP,LOOP,EXHAUST	3
18	XBFZZ		7JYX1	T231217	FLEX PIPE,EXHAUST	1
19	XBFZZ		7JYX1	T231252	BLANKET,EXHAUST	1
20	XBFZZ		7JYX1	TG903-3609	PLATE,EXHAUST	1
21	XBFZZ		7JYX1	TG903-3610	ELBOW,EXHAUST	1
22	PAFZZ	5310-01-602-4140	7JYX1	1005375	NUT,SELF-LOCKING, HEXAGON	4
23	PAFZZ	5305-01-558-7717	7JYX1	T270547	SCREW,CAP HEXAGON HEAD	1
24	PAFZZ	5310-01-503-8765	7JYX1	T270580	WASHER,FLAT	2
25	XBFZZ		7JYX1	1004235	BRACKET,MOUNTING	1
26	PAFZZ	5310-01-552-3984	7JYX1	T270550	NUT,SELF-LOCKING, HEXAGON	1
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
CONTROL PANEL ASSEMBLY

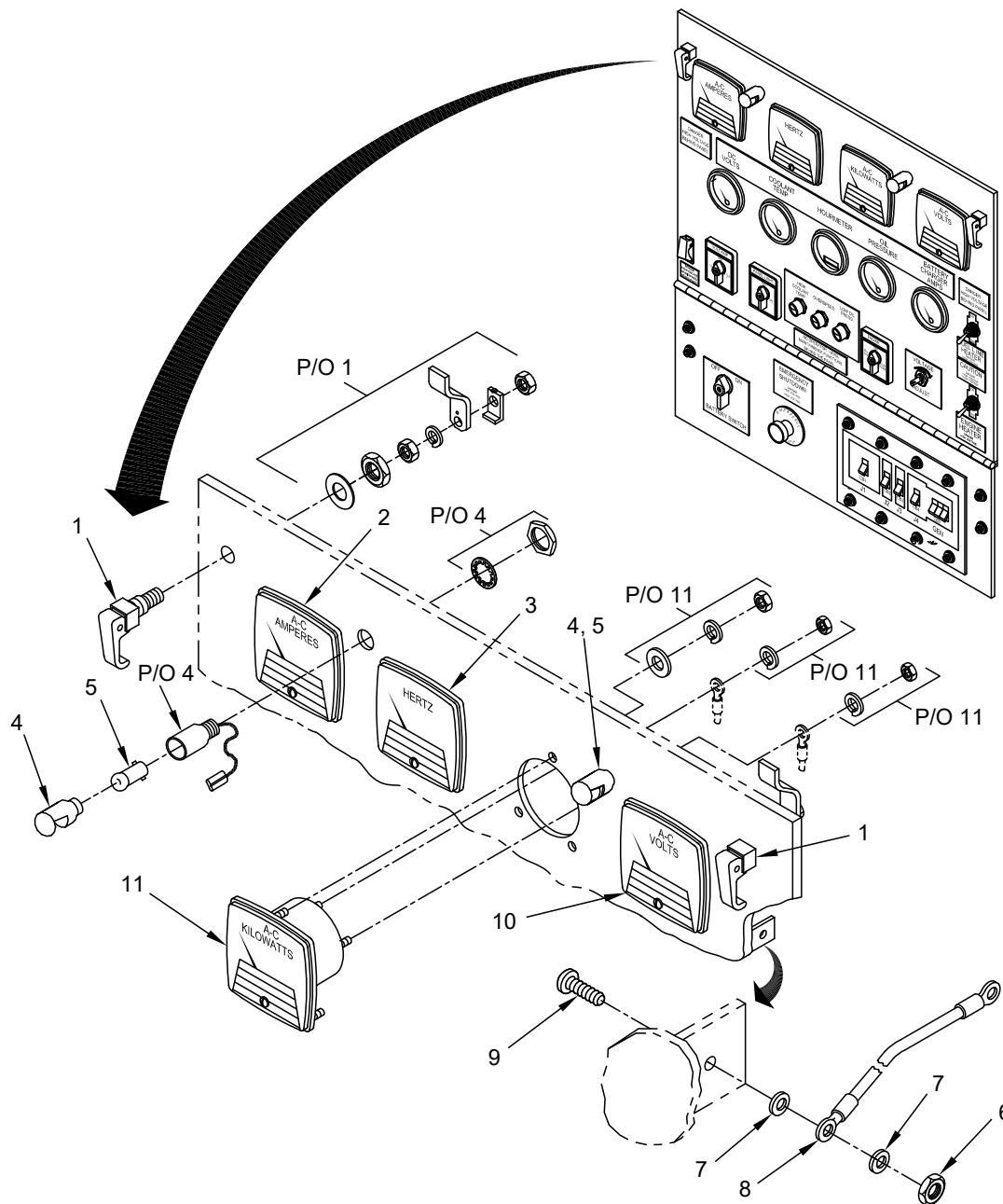


Figure 11. Control Panel Assembly (Sheet 1 of 4).

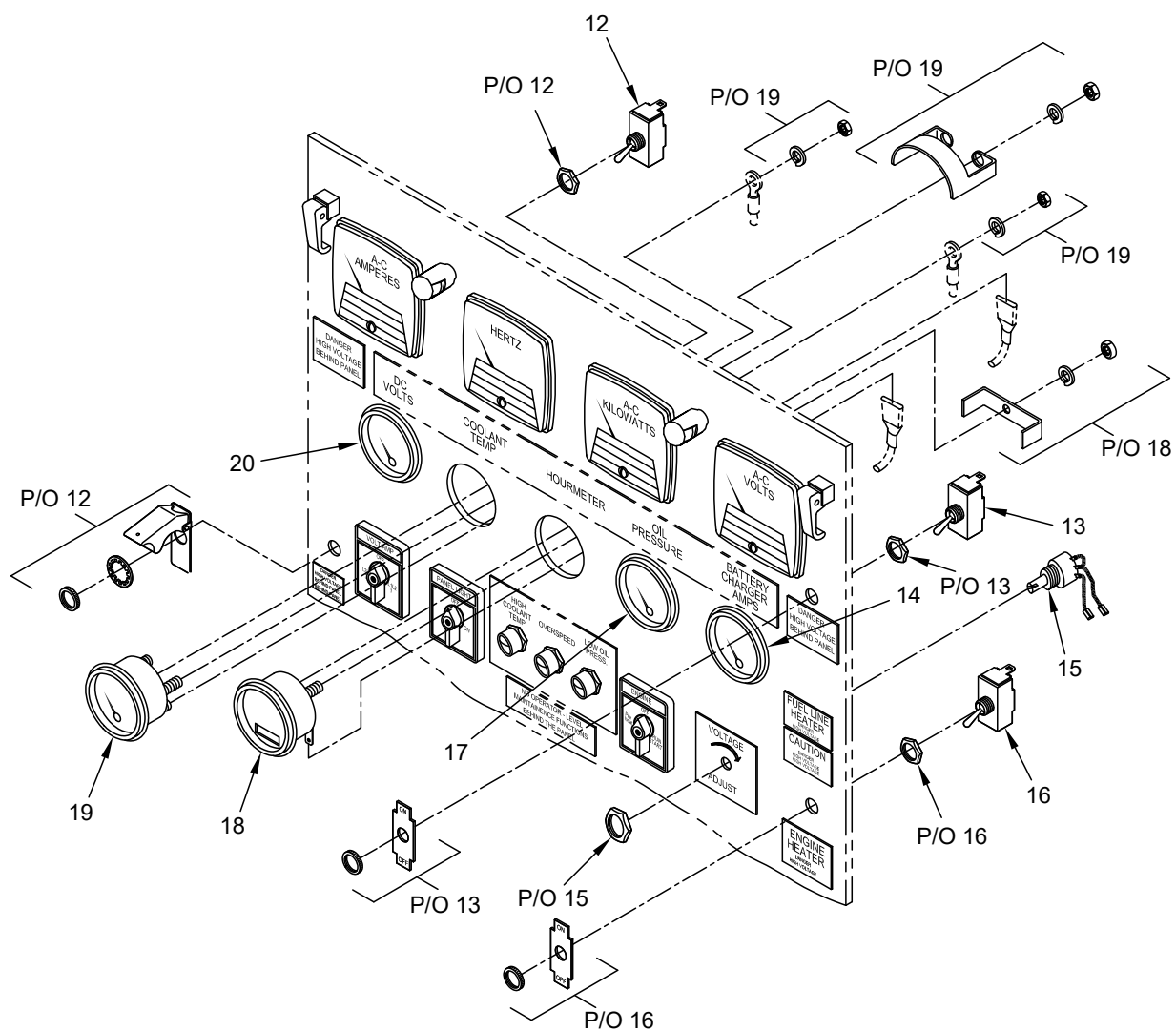


Figure 11. Control Panel Assembly (Sheet 2 of 4).

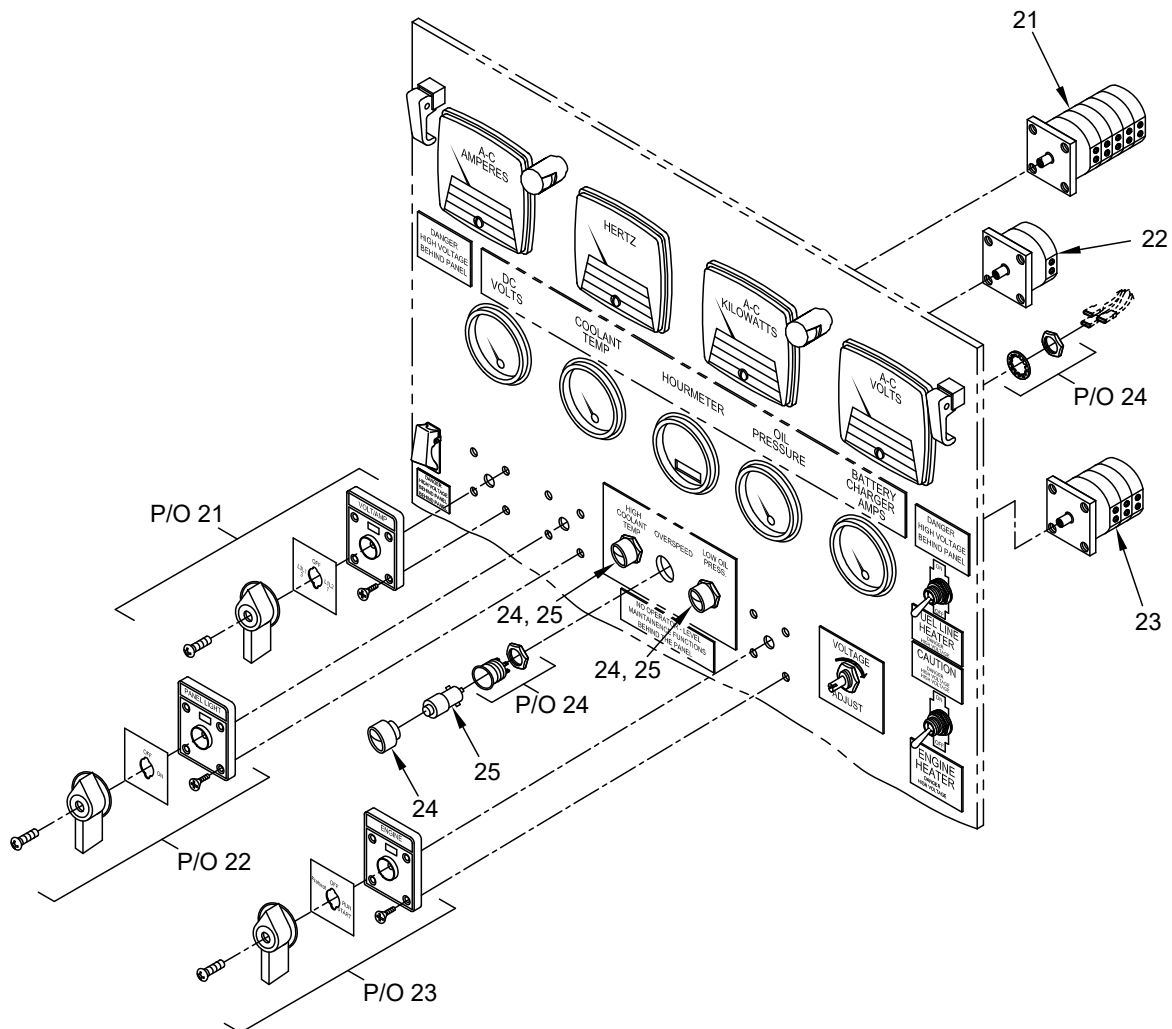


Figure 11. Control Panel Assembly (Sheet 3 of 4).

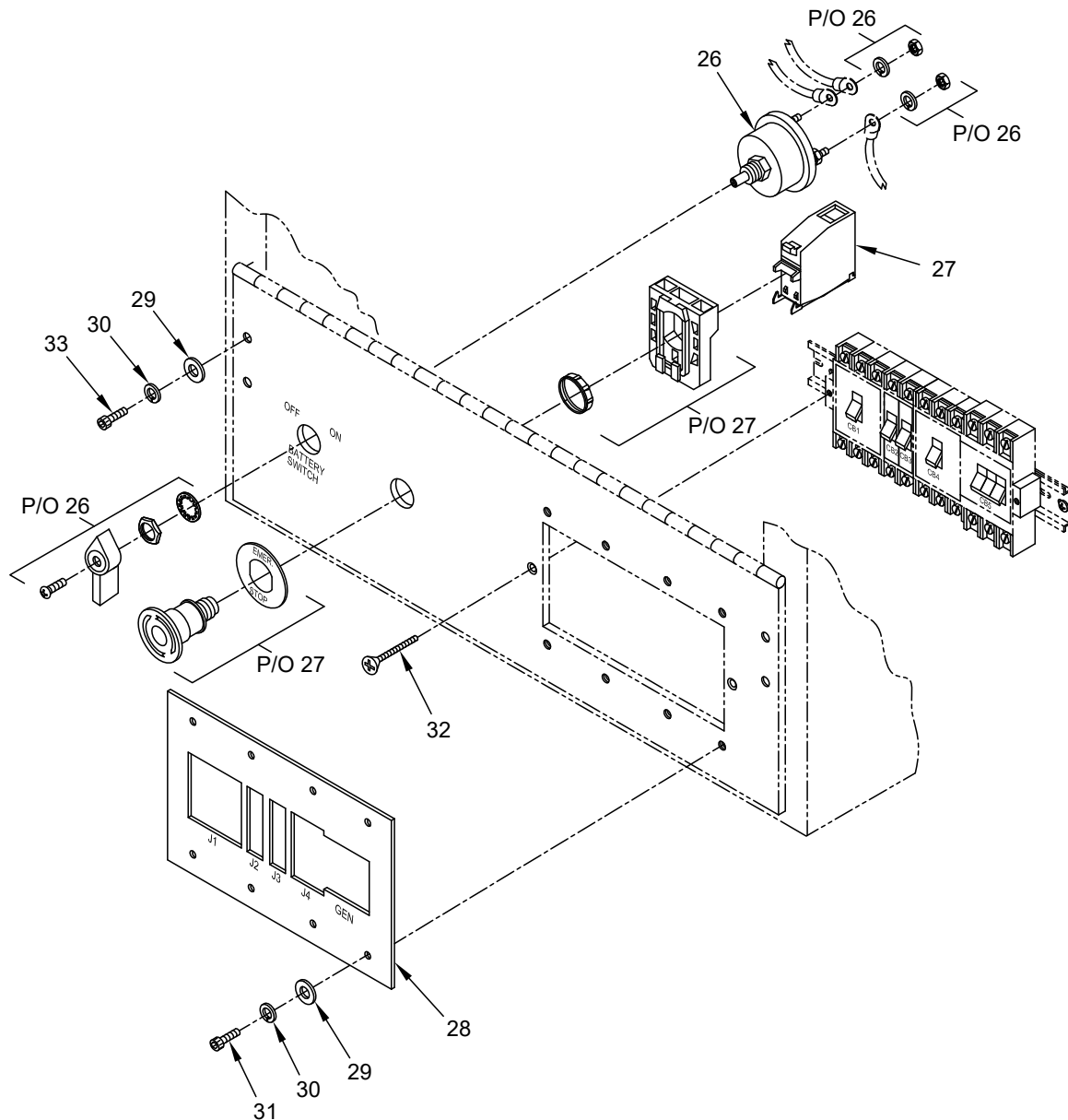


Figure 11. Control Panel Assembly (Sheet 4 of 4).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010205	
					FIGURE 11 CONTROL PANEL ASSEMBLY,	
1	PAOZZ	5340-01-552-2466	7JYX1	T220038	FASTENER,PAWL	2
2	PAFZZ		7JYX1	T260210	AMMETER	1
3	PAFZZ		7JYX1	T260212	METER,ELECTRICAL FREQUENCY	1
4	PAOZZ	6210-00-643-0339	7JYX1	T260304	LIGHT,PANEL	2
5	PAOZZ	6240-00-019-3093	7JYX1	T260305	LAMP,INCANDESCANT	2
6	PAFZZ		7JYX1	T270150	NUT,PLAIN,HEXAGON.....	2
7	PAFZZ	5310-01-553-0370	7JYX1	T270180	WASHER,FLAT	4
8	PAFZZ	4010-01-553-2369	7JYX1	T270920	WIRE ROPE ASSEMBLY, SINGLE LEG.....	2
9	PAFZZ		7JYX1	T270130	SCREW,MACHINE	2
10	PAFZZ		7JYX1	T260215	VOLTMETER	1
11	PAFZZ		7JYX1	T260213	WATTMETER.....	1
12	PAFZZ		7JYX1	T260487	SWITCH,TOGGLE	1
13	PAFZZ		7JYX1	TG903-5503	SWITCH,TOGGLE	1
14	PAFZZ		7JYX1	T260206	AMMETER	1
15	PAFZZ		7JYX1	T260410	SWITCH,ELECTRONIC	1
16	PAFZZ		7JYX1	TG903-5505	SWITCH,TOGGLE	1
17	PAFZZ		7JYX1	T260205	INDICATOR,PRESSURE...	1
18	PAFZZ	6645-01-263-9434	7JYX1	T260204	METER,TIME TOTALIZING.....	1
19	PAFZZ		7JYX1	T260203	METER,SPECIAL SCALE	1
20	PAFZZ		7JYX1	T260201	VOLTMETER	1
21	PAFZZ		7JYX1	T260431	SWITCH,ELECTRONIC	1
22	PAFZZ		7JYX1	T260441	SWITCH,ELECTRONIC	1
23	PAFZZ		7JYX1	T260451	SWITCH,ELECTRONIC	1
24	PAOZZ	6210-00-686-4999	7JYX1	T260300	LIGHT,INDICATOR	3
25	PAOZZ	6240-01-552-6210	7JYX1	T260301	LAMP,INCANDESCENT	3
26	PAFZZ	5930-01-330-2858	7JYX1	T260486	SWITCH,ROTARY	1
27	PAFZZ		7JYX1	T260489	SWITCH,PUSH-PULL	1

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
28	XBFZZ		7JYX1	T220034-1	PLATE,MOUNTING	1
29	PAFZZ	5310-01-555-7064	7JYX1	T270281	WASHER,FLAT	12
30	PAFZZ	5310-01-555-6402	7JYX1	T270291	WASHER,LOCK.....	12
31	PAFZZ		7JYX1	T270231	SCREW,MACHINE	8
32	PAFZZ		7JYX1	T270128	SCREW,MACHINE	2
33	PAFZZ		7JYX1	T270235	SCREW,MACHINE	4
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
POWER DISTRIBUTION PANEL ASSEMBLY

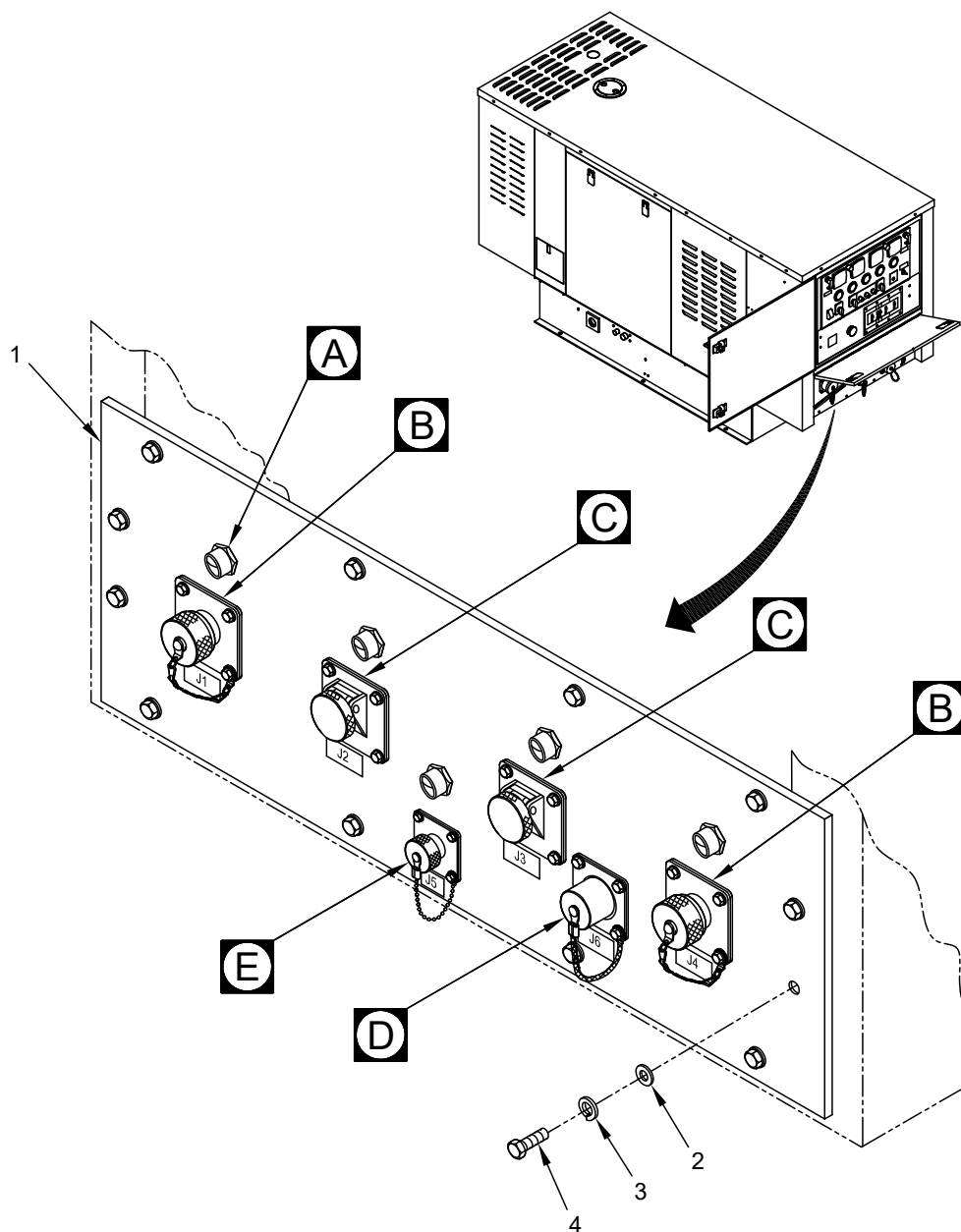


Figure 12. Power Distribution Panel Assembly (Sheet 1 of 4).

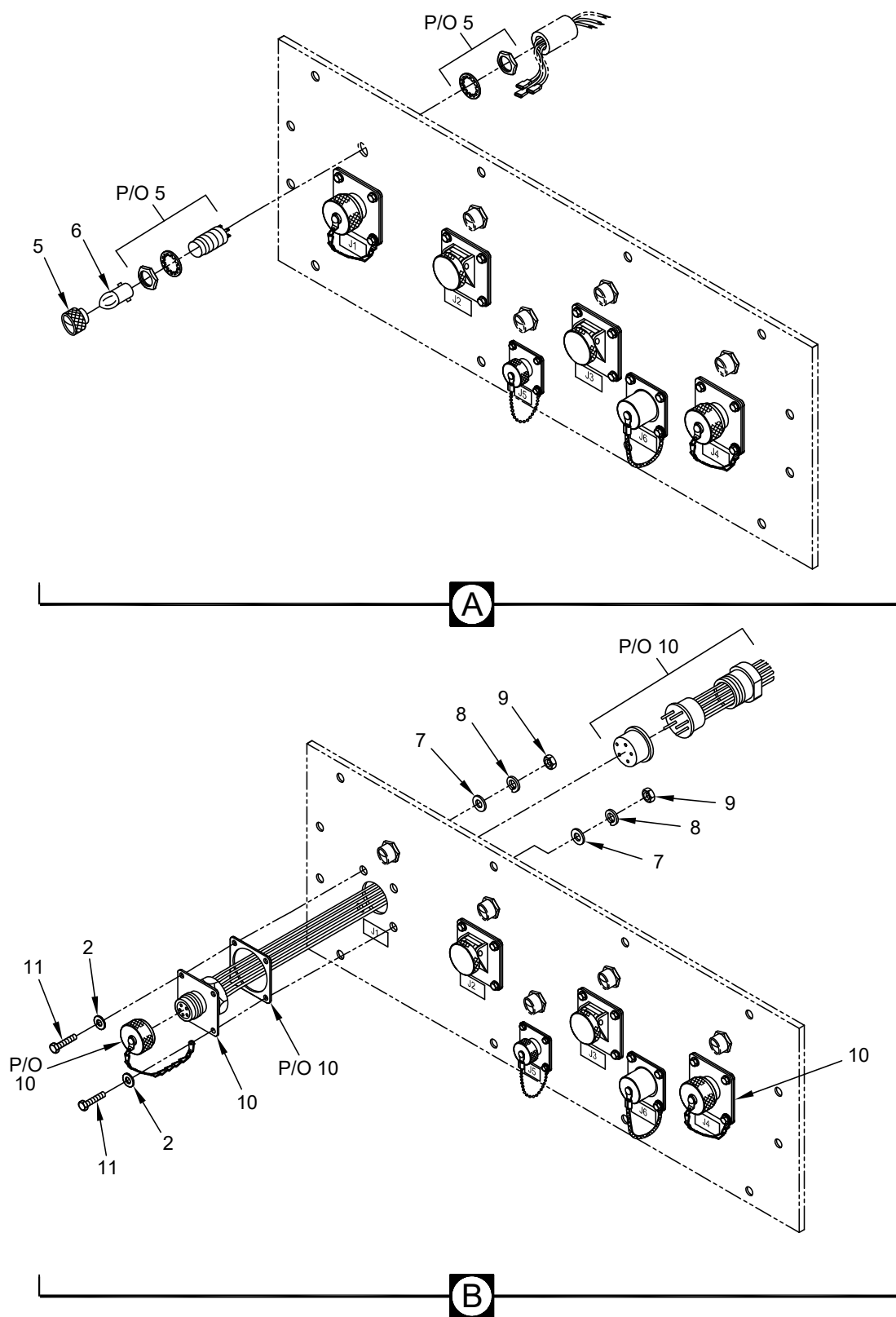


Figure 12. Power Distribution Panel Assembly (Sheet 2 of 4).

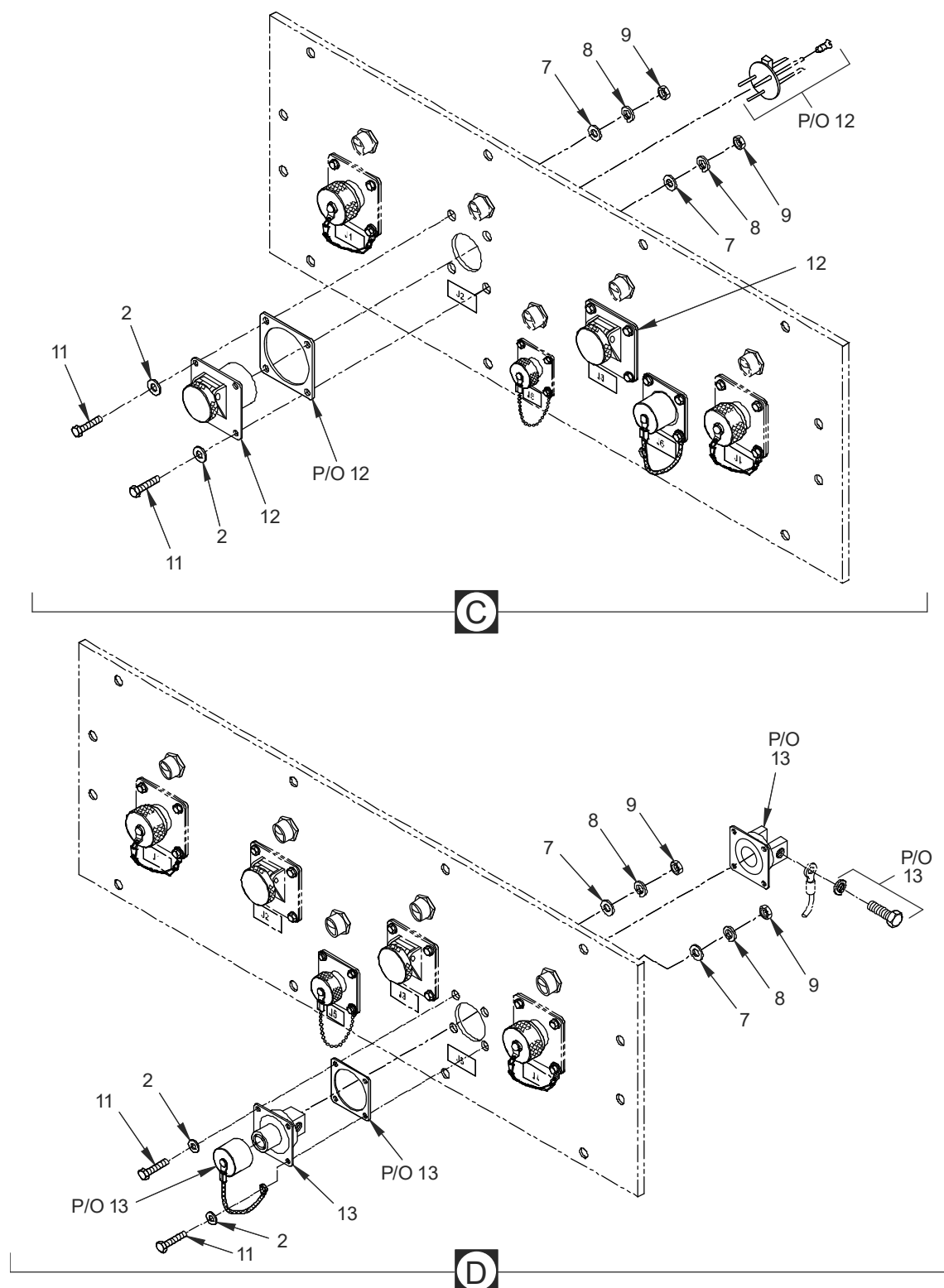


Figure 12. Power Distribution Panel Assembly (Sheet 3 of 4).

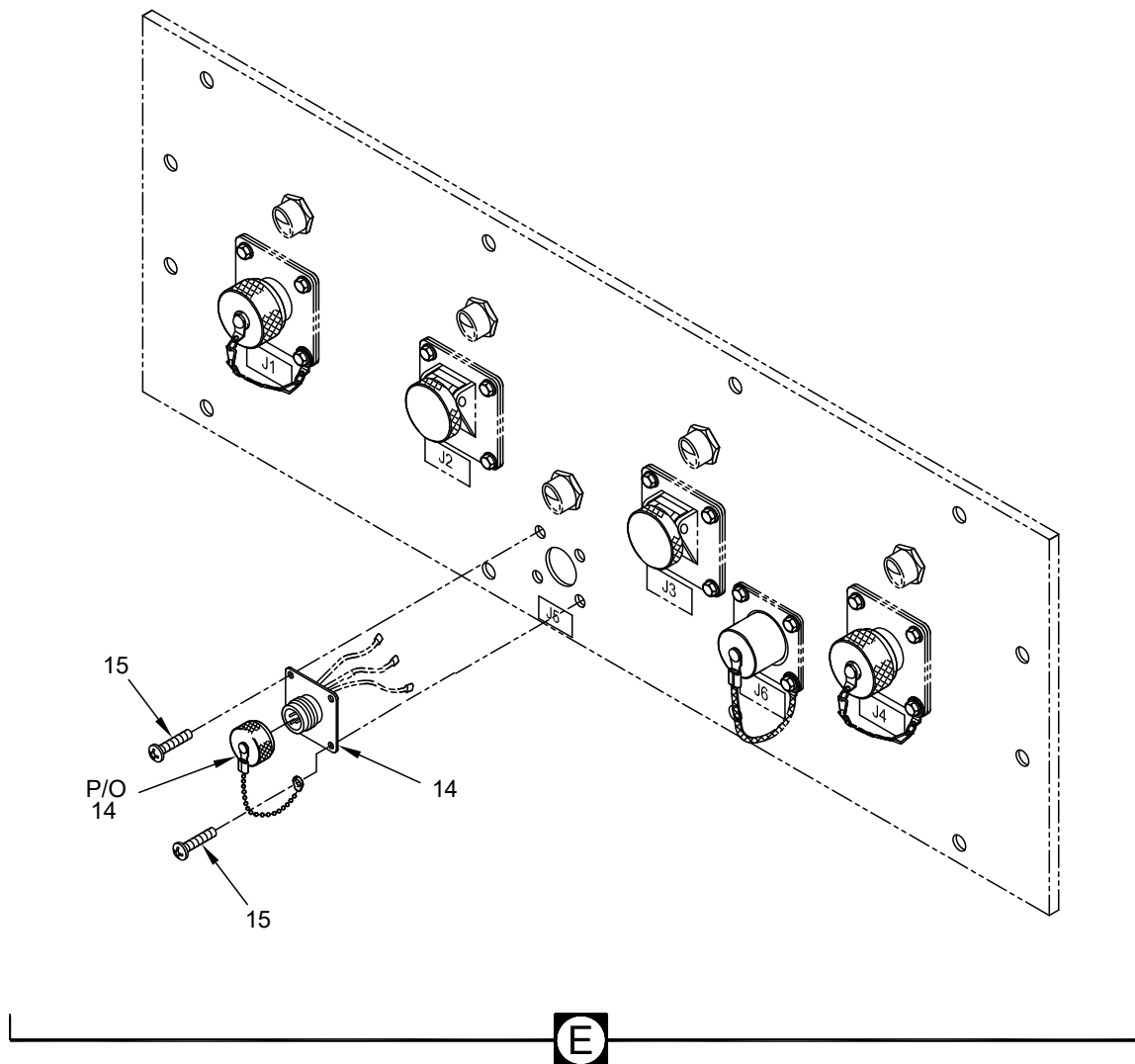


Figure 12. Power Distribution Panel Assembly (Sheet 4 of 4).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
					GROUP 010206	
					FIGURE 12 POWER DISTRIBUTION PANEL ASSEMBLY,	
1	XBFZZ		7JYX1	T220035-1	PANEL,ELECTRICAL EQUIPMENT	1
2	PAFZZ	5310-01-555-7064	7JYX1	T270281	WASHER,FLAT	64
3	PAFZZ		7JYX1	T270291	WASHER,LOCK.....	24
4	PAFZZ	5305-01-558-7195	7JYX1	T270241	SCREW,CAP,HEXAGON HEAD	12
5	PAOZZ	6210-01-108-2600	7JYX1	T260302	LIGHT,INDICATOR.....	5
6	PAOZZ		7JYX1	T260301	LAMP ASSEMBLY	5
7	PAFZZ	5310-01-552-4523	7JYX1	T270280	WASHER,FLAT	20
8	PAFZZ	5310-01-555-6402	7JYX1	T270290	LOCK WASHER.....	20
9	PAFZZ		7JYX1	T270250	NUT,LOCKING	20
10	PAFZZ		7JYX1	T260503	CONNECTOR, RECEPTACLE, ELECTRICAL	2
11	PAFZZ	5305-01-553-0345	7JYX1	T270242	SCREW,CAP,HEXAGON HEAD	20
12	PAFZZ		7JYX1	T260505	CONNECTOR,RECEPTACL E, ELECTRICAL	2
13	PAFZZ	5935-01-097-9974	7JYX1	T260520	CONNECTOR,RECEPTACL E, ELECTRICAL	1
14	PAFZZ		7JYX1	T260506	CONNECTOR,RECEPTACL E, ELECTRICAL	1
15	PAFZZ		7JYX1	T270039	SCREW,MACHINE,BLACK	4
					END OF FIGURE	

**PARTS INFORMATION
HP-2C/185 UST Trailer
BARRIER PANEL ASSEMBLY**

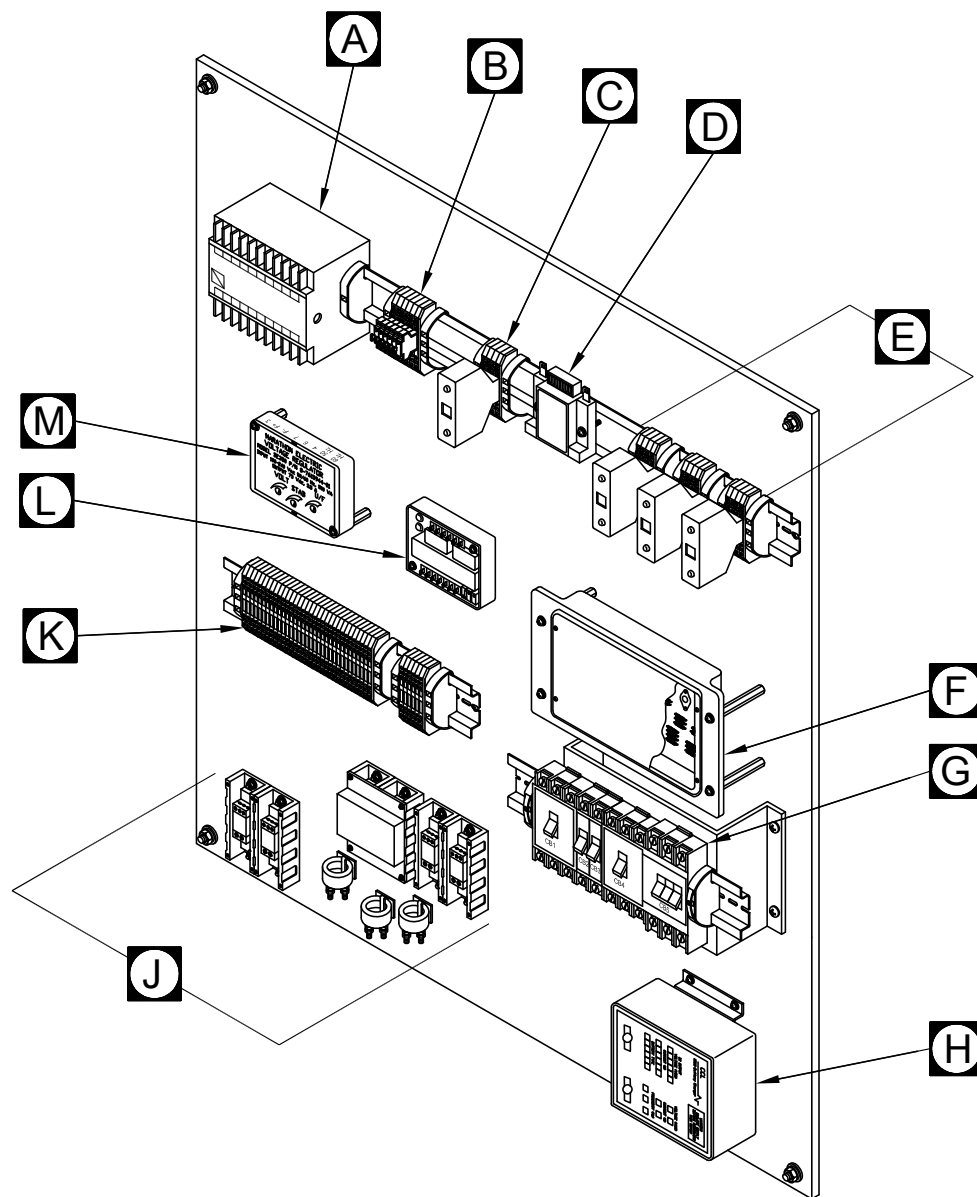


Figure 13. Barrier Panel Assembly (Sheet 1 of 7).

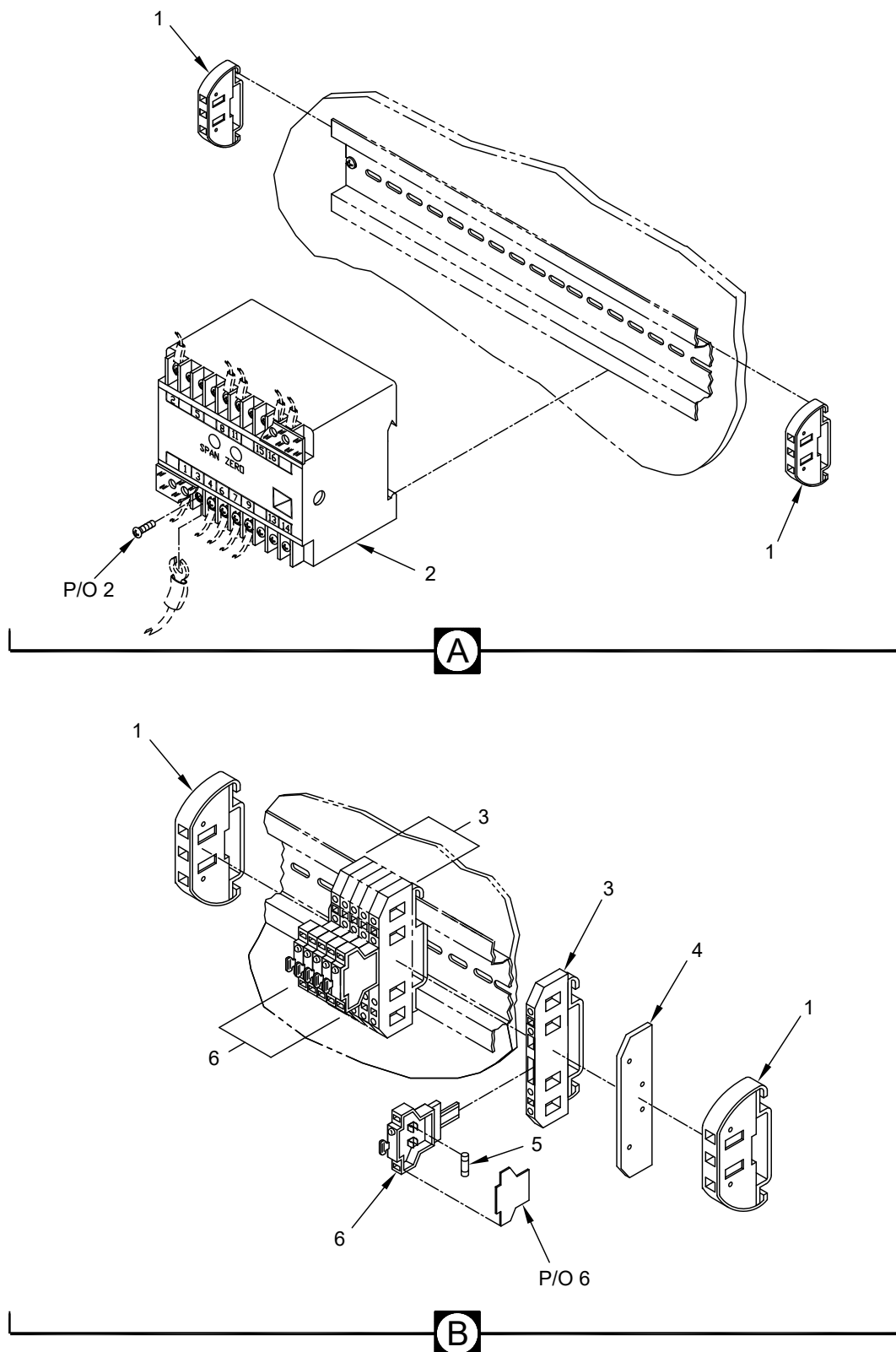


Figure 13. Barrier Panel Assembly (Sheet 2 of 7).

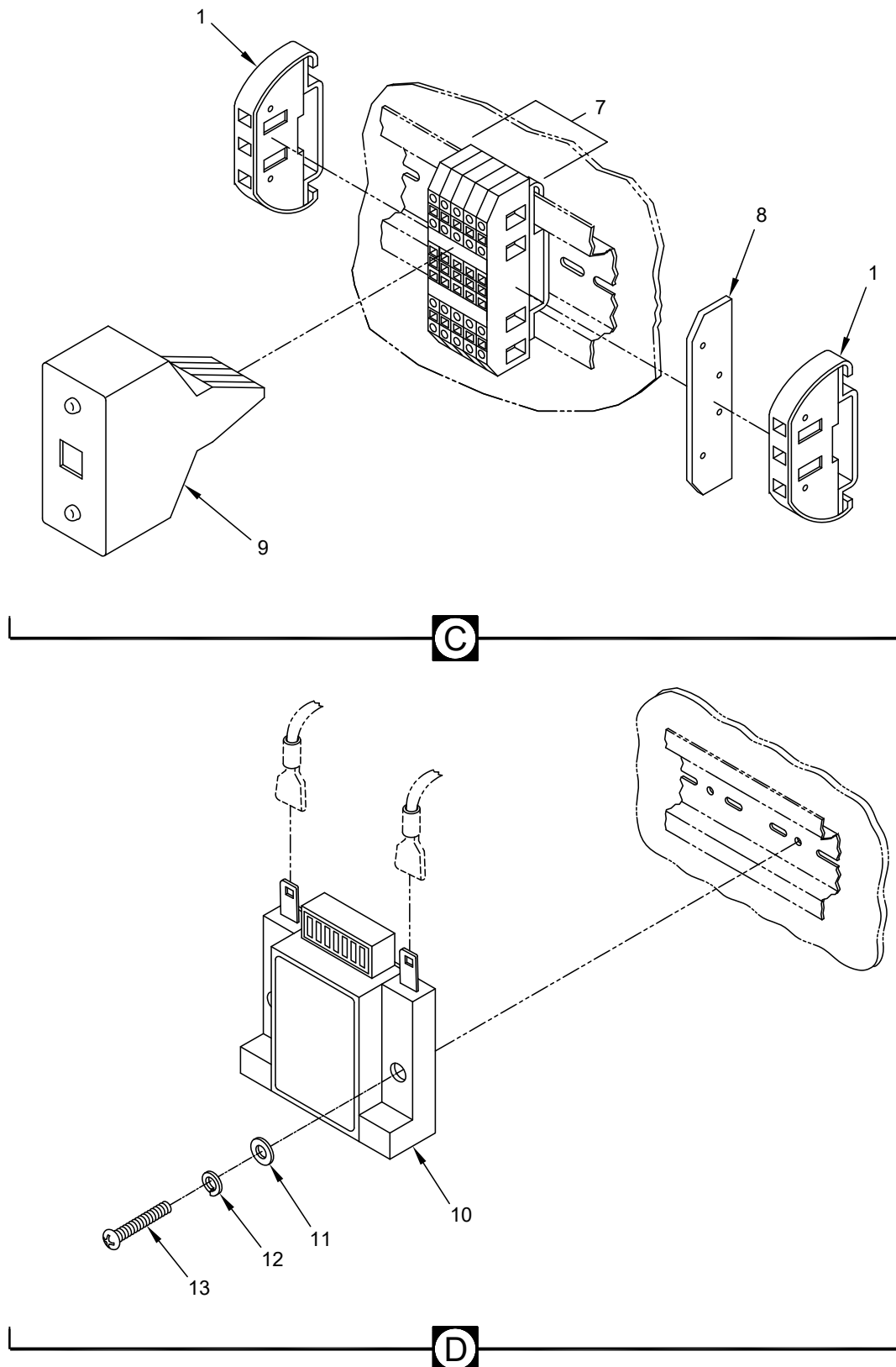


Figure 13. Barrier Panel Assembly (Sheet 3 of 7).

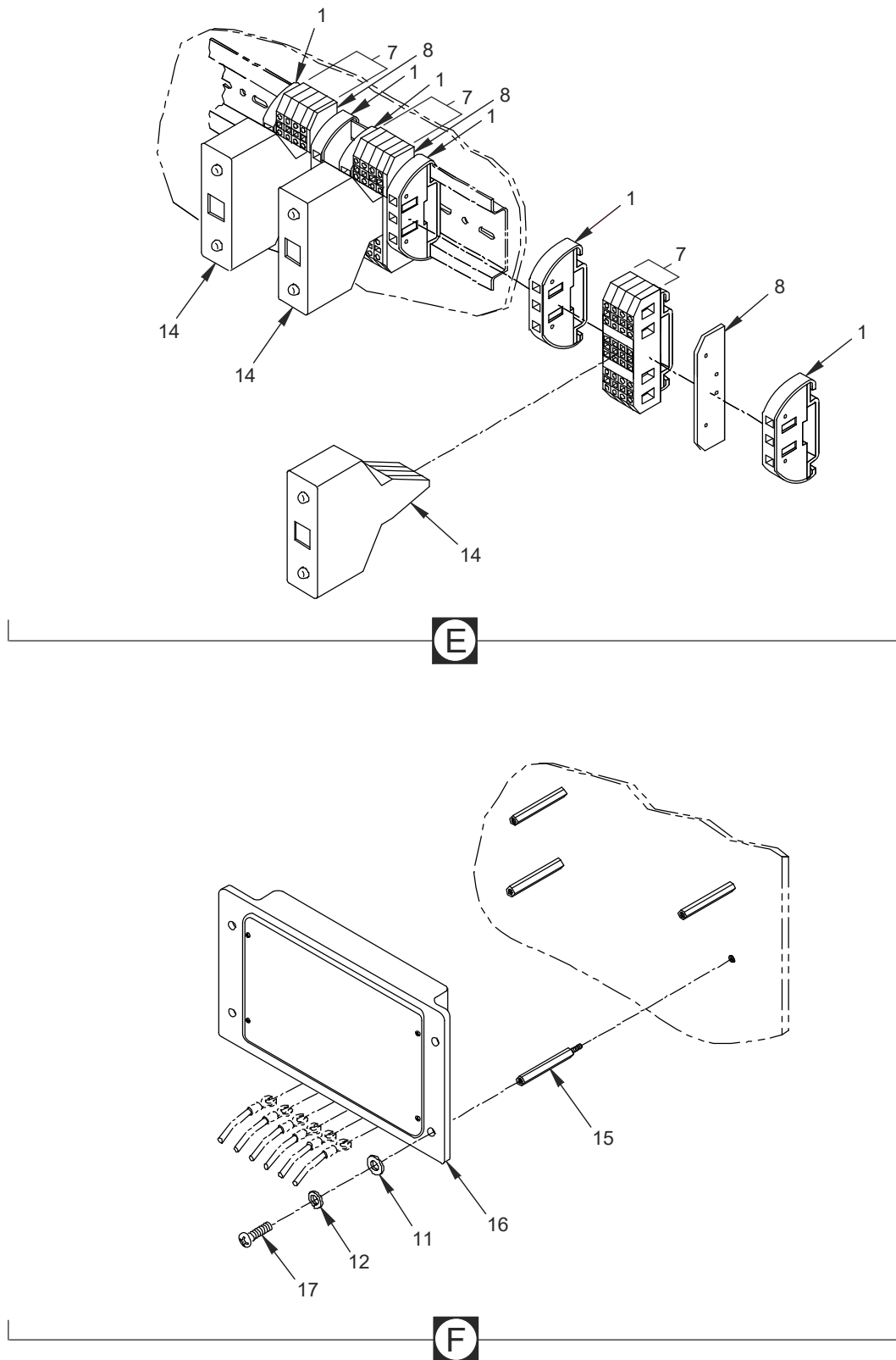


Figure 13. Barrier Panel Assembly (Sheet 4 of 7).

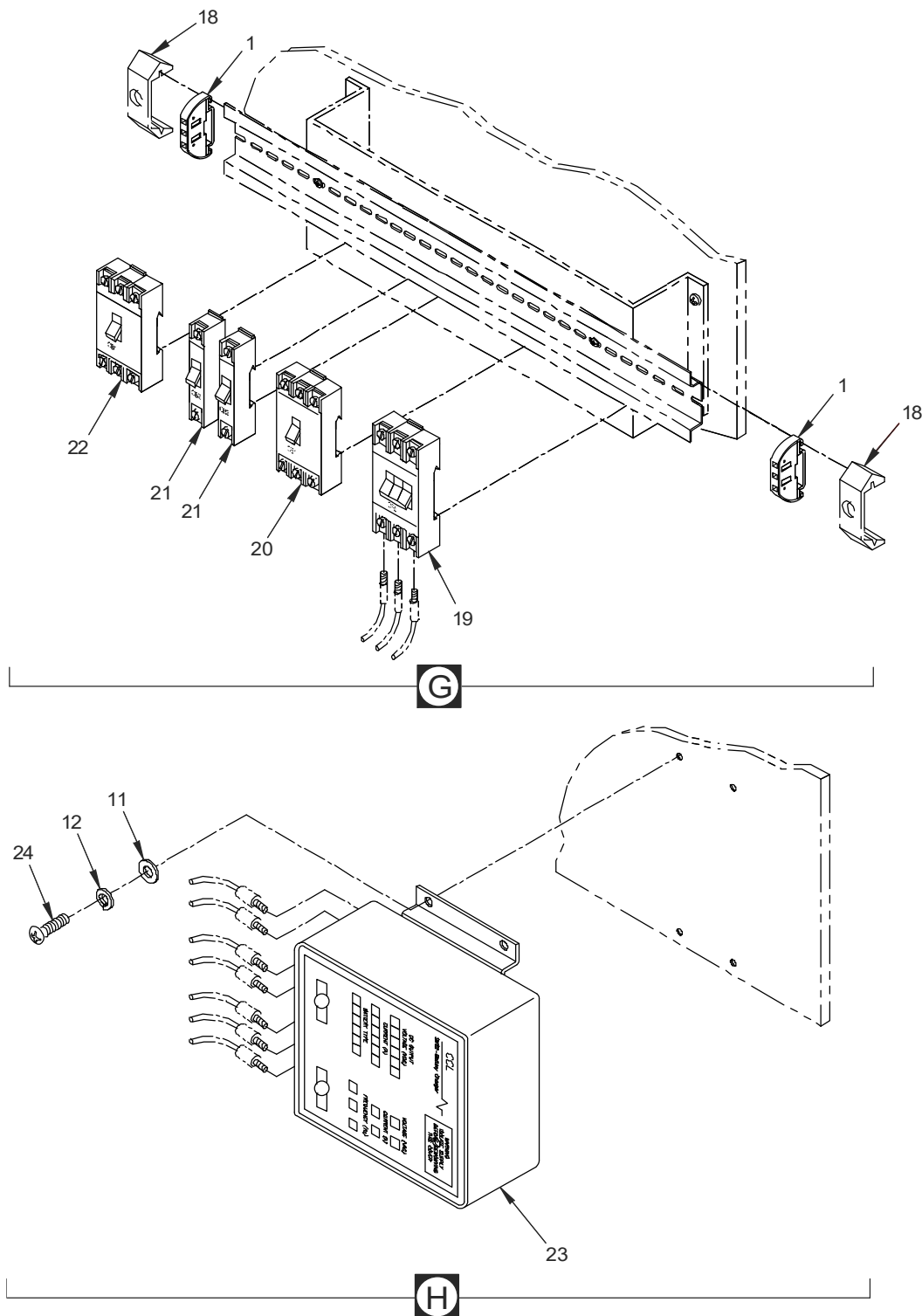


Figure 13. Barrier Panel Assembly (Sheet 5 of 7).

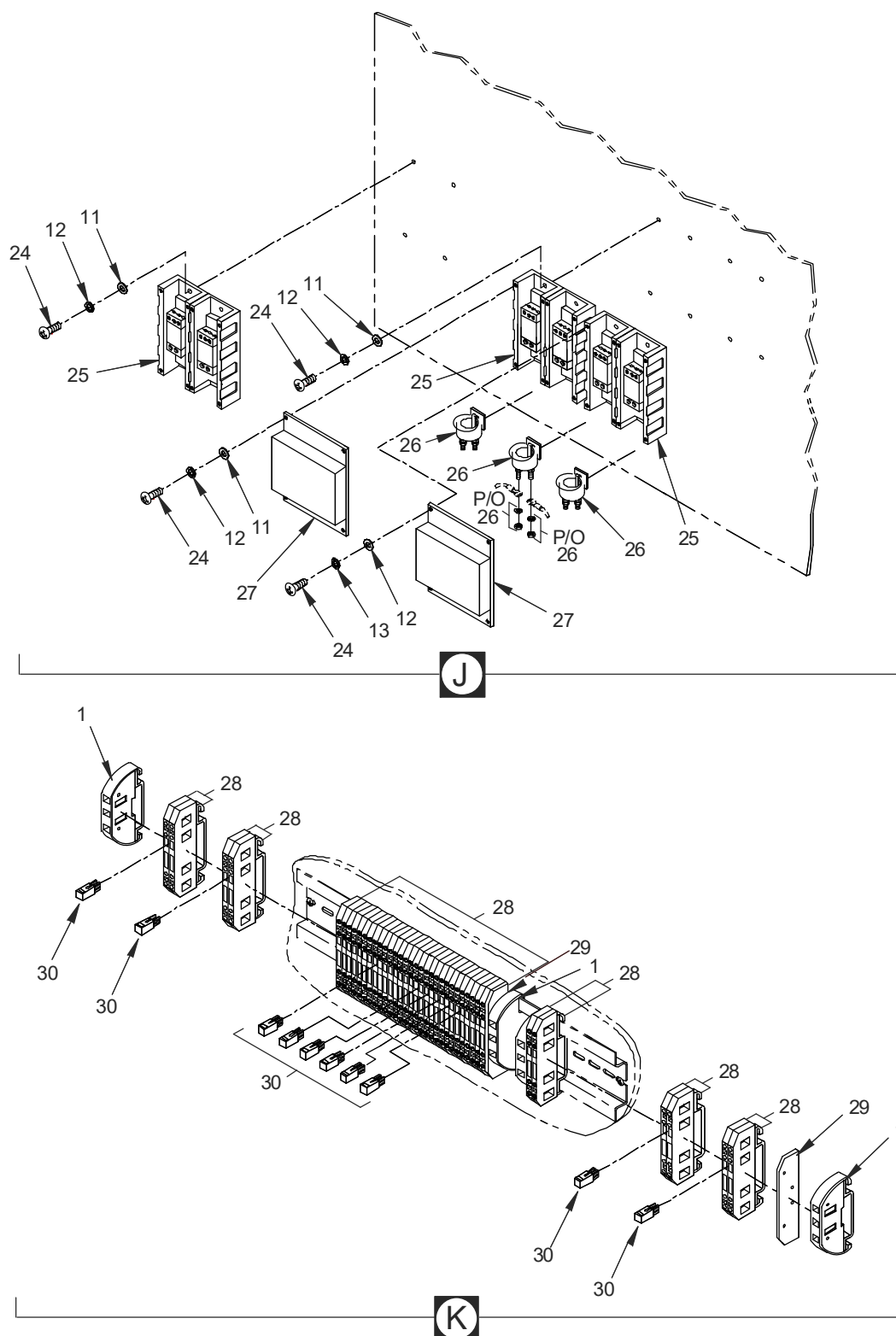


Figure 13. Barrier Panel Assembly (Sheet 6 of 7).

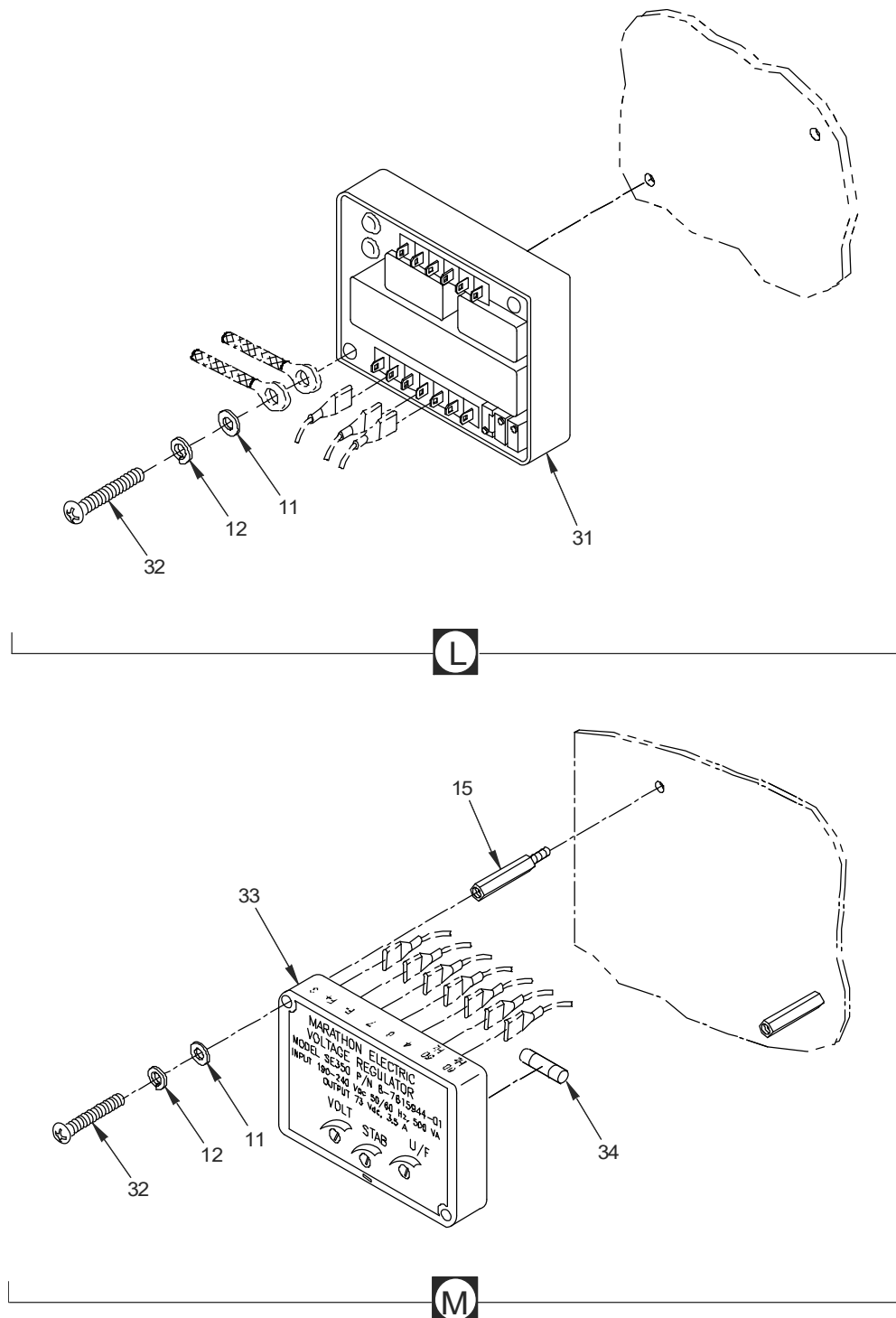


Figure 13. Barrier Panel Assembly (Sheet 7 of 7).

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
GROUP 010207						
FIGURE 13 BARRIER PANEL ASSEMBLY,						
1	PAFZZ	5340-99-519-4305	7JYX1	T260606	END STOP	18
2	PAFZZ	5963-01-569-0378	7JYX1	T260720	ELECTRONIC MODULE, STANDARDIZED	1
3	PAFZZ	2920-99-690-7498	7JYX1	T260621	TERMINAL BLOCK	6
4	PAFZZ		7JYX1	T260611	PLATE, MOUNTING.....	1
5	PAFZZ	5920-01-327-2572	7JYX1	T260753	FUSE, CARTRIDGE.....	6
6	PAFZZ	5920-01-480-3209	7JYX1	T260640	FUSE, PLUG	6
7	PAFZZ	2920-99-983-9545	7JYX1	T260620	TERMINAL BLOCK	17
8	PAFZZ		7JYX1	T260610	PLATE, MOUNTING.....	4
9	PAFZZ	5945-99-360-1748	7JYX1	T260632	SWITCH, ELECTRONIC	1
10	PAFZZ	5999-01-113-0824	7JYX1	T260730	Module, Time Delay	1
11	PAFZZ	5310-01-553-0370	7JYX1	T270180	WASHER, FLAT	34
12	PAFZZ	5310-01-569-4411	7JYX1	T270190	WASHER, LOCK.....	34
13	PAFZZ	5310-01-569-7811	7JYX1	T270132	SCREW, MACHINE.....	2
14	PAFZZ	5943-99-598-7263	7JYX1	T260630	RELAY, SWITCH.....	3
15	PAFZZ	5340-01-569-5498	7JYX1	T270175	STANDOFF, THREADED, SNAP-IN	2
16	PAFZZ	6110-01-569-1448	7JYX1	T17017P	CONTROLLER, MOTOR	1
17	PAFZZ	5305-01-569-1803	7JYX1	T270129	SCREW, MACHINE.....	4
18	PAFZZ		7JYX1	T260605	BRACKET, MOUNTING.....	2
19	PAFZZ	5925-01-569-0391	7JYX1	T260766-1	CIRCUIT BREAKER.....	1
20	PAFZZ	5925-01-043-9283	7JYX1	T260761	CIRCUIT BREAKER.....	1
21	PAFZZ	5925-01-040-7979	7JYX1	T260760	CIRCUIT BREAKER.....	2
22	PAFZZ	5925-01-569-0297	7JYX1	T260763	CIRCUIT BREAKER.....	1
23	PAFZZ	6130-01-569-2725	7JYX1	T260703	POWER SUPPLY	1
24	PAFZZ	5305-01-568-4710	7JYX1	T270130	SCREW, MACHINE.....	24
25	PAFZZ	5940-01-568-9122	7JYX1	T260702	TERMINAL BLOCK	3
26	PAFZZ	5950-01-569-0337	7JYX1	T260714	TRANSFORMER, CURRENT	3
27	XBFZZ		7JYX1	T260701	COVER, PROTECTIVE.....	2
28	PAFZZ	5940-01-528-7120	7JYX1	T260624	TERMINAL JUNCTION BLOCK, SECTION A	39
29	PAFZZ		7JYX1	T260612	PLATE, MOUNTING.....	2
30	PAFZZ	5940-01-349-6763	7JYX1	T260615	JUMPER, ELECTRICAL, SPECIAL.....	10

(1) ITEM NO.	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY.
31	PAFZZ	5895-01-569-1469	7JYX1	T260734	SWITCH, ELECTRONIC	1
32	PAFZZ	5305-01-569-7744	7JYX1	T270131	SCREW, MACHINE.....	4
33	PAFZZ	6110-01-533-9768	7JYX1	T260736	VOLTAGE REGULATOR SUBASSEMBLY	1
34	PAFZZ	5920-01-285-9879	7JYX1	T260753	FUSE, CARTRIDGE.....	1
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
CHASSIS FRAME ASSEMBLY, T211125G GREEN, T211125T TAN

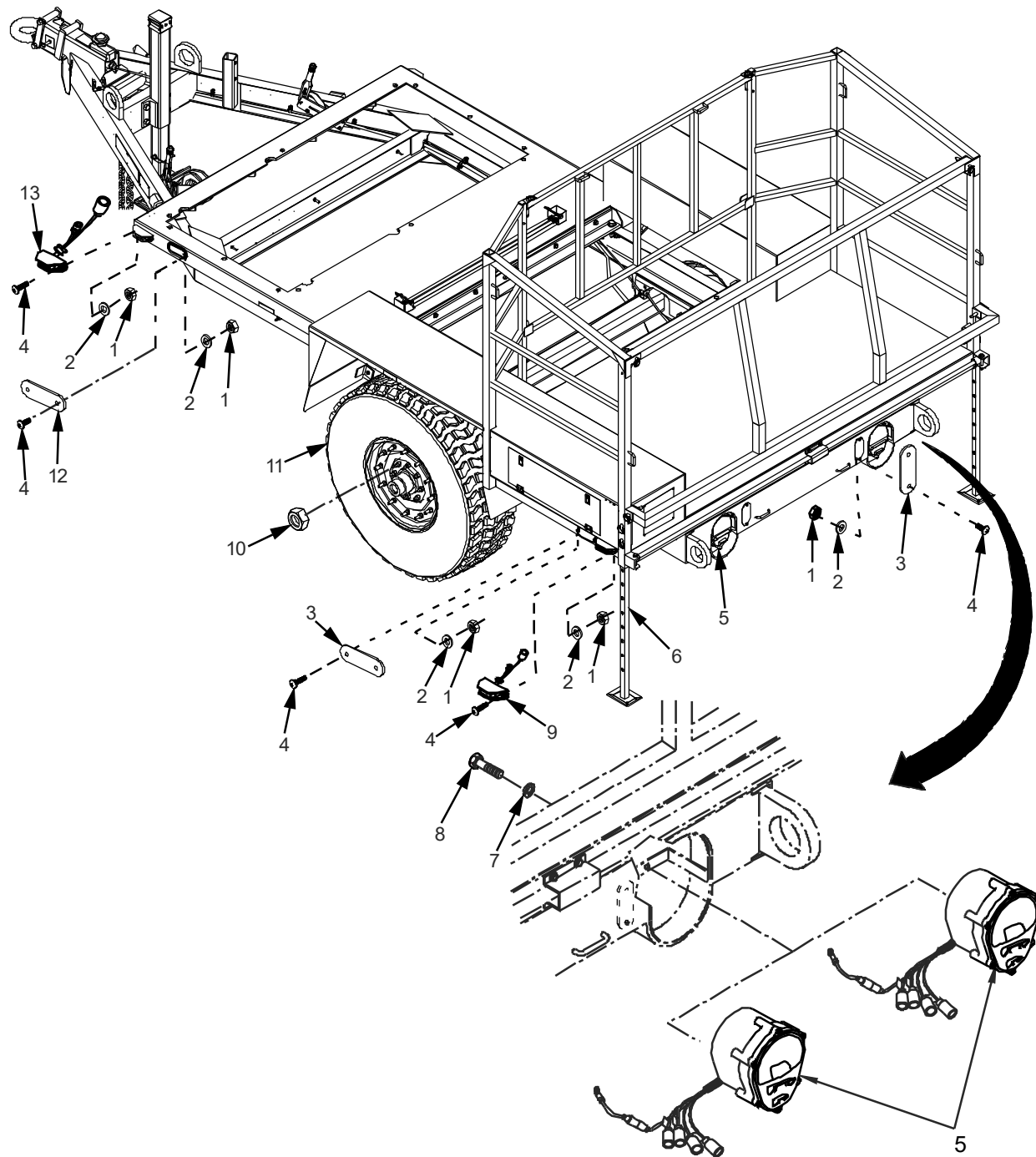


Figure 14. Chassis Frame Assembly, T211125G Green, T211125T Tan (Sheet 1 of 5)

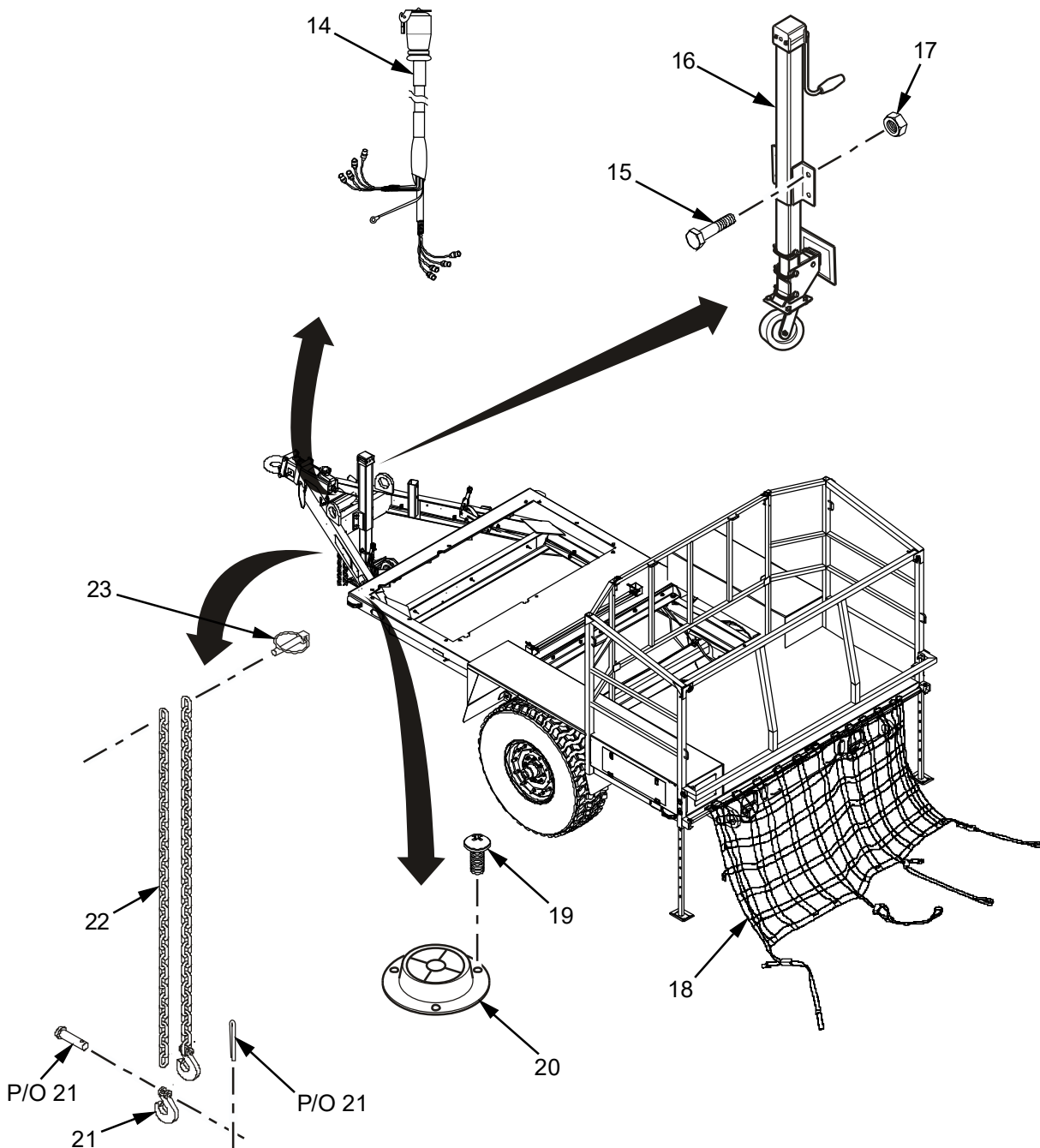


Figure 14. Chassis Frame Assembly, T211125G Green, T211125T Tan (Sheet 2 of 5)

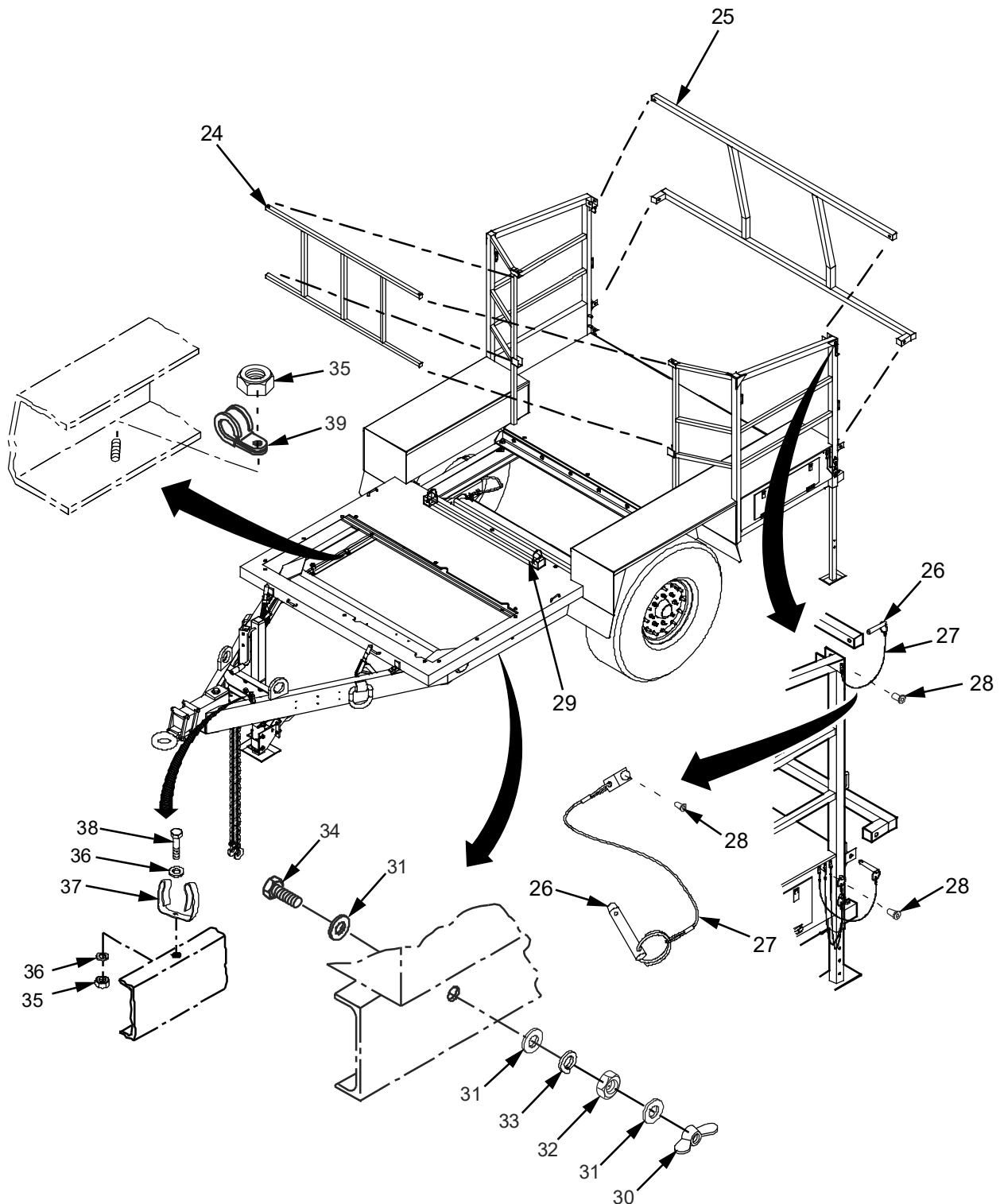


Figure 14. Chassis Frame Assembly, T211125G Green, T211125T Tan (Sheet 3 of 5)

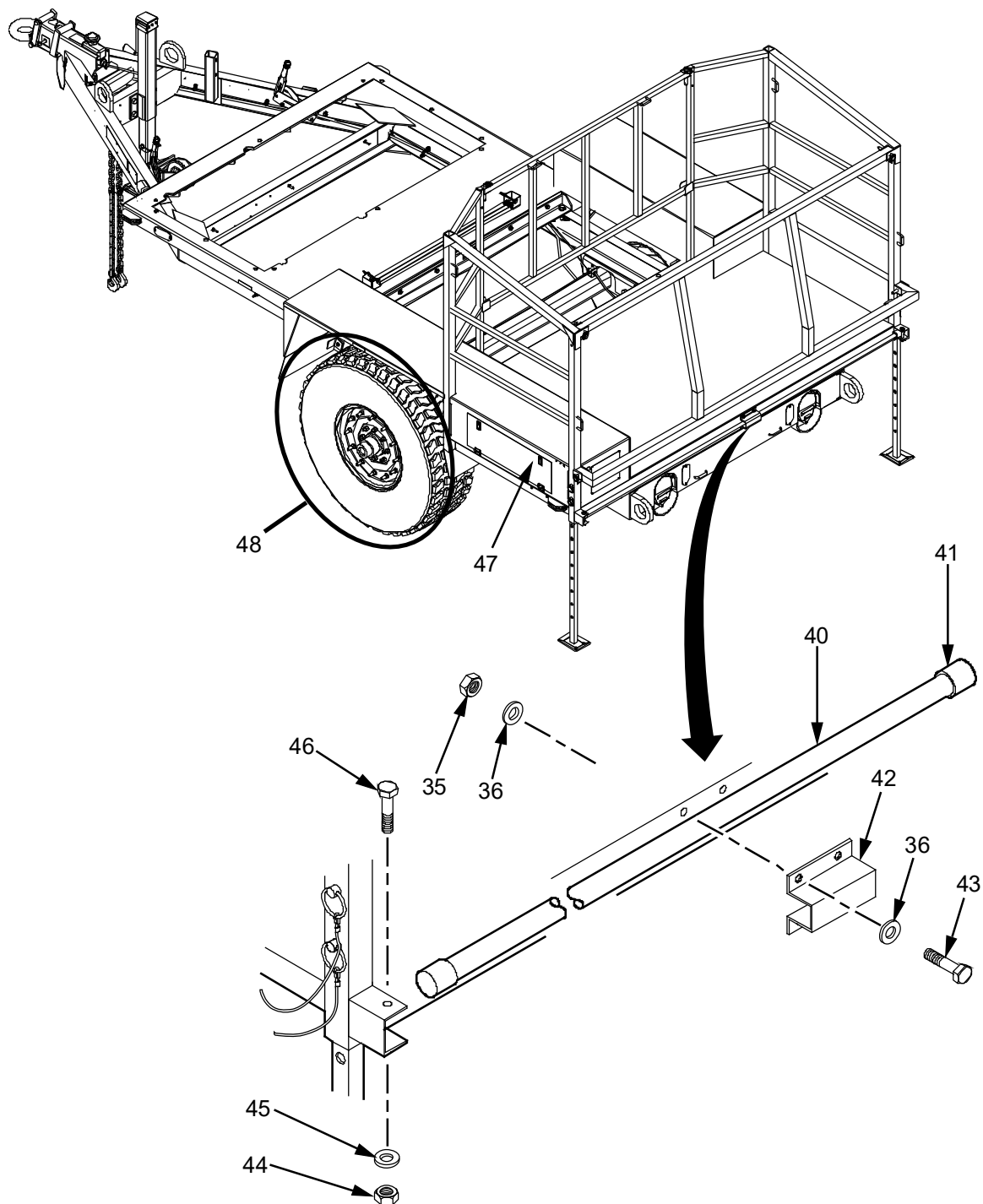


Figure 14. Chassis Frame Assembly, T211125G Green, T211125T Tan (Sheet 4 of 5)

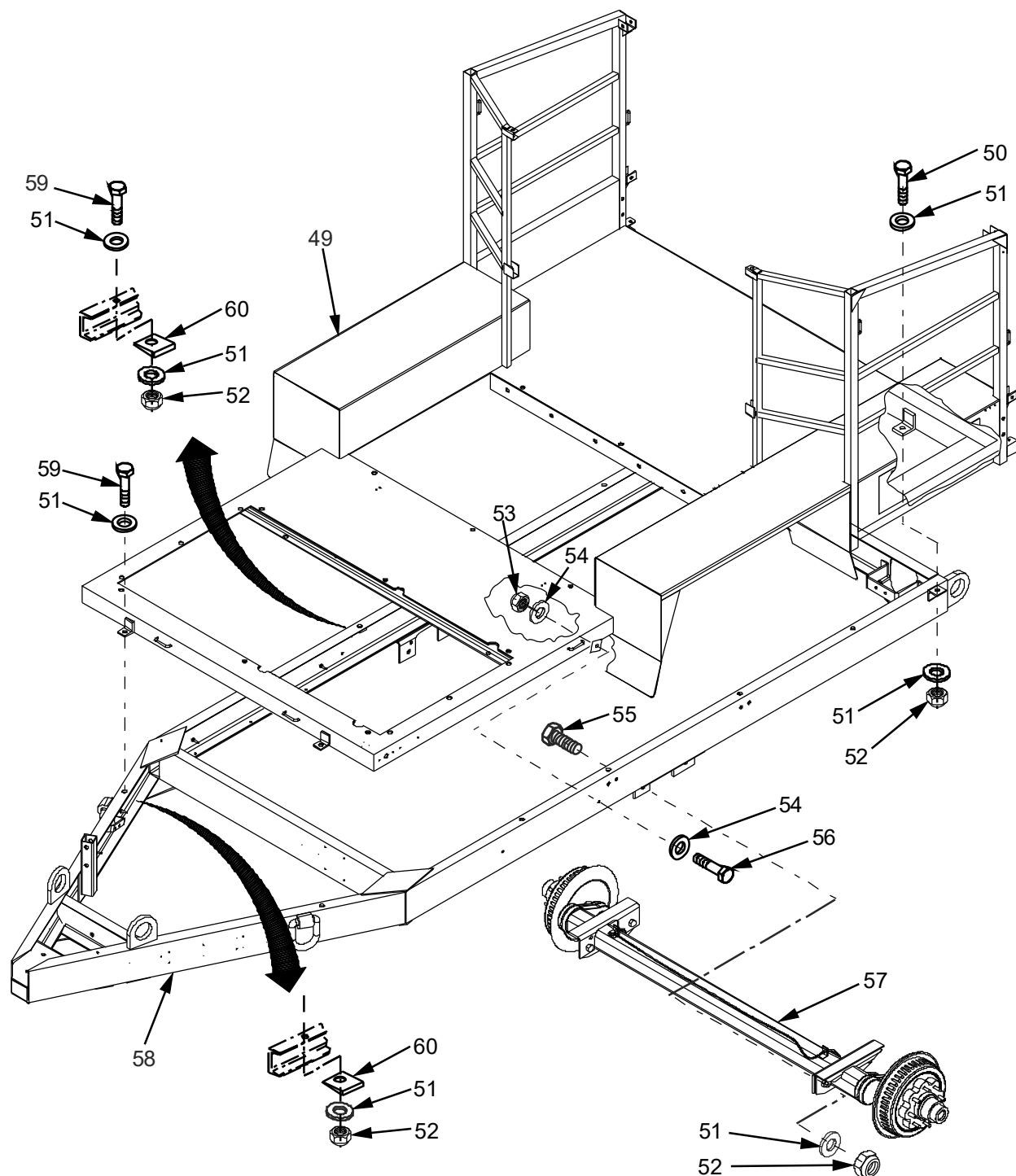


Figure 14. Chassis Frame Assembly, T211125G Green, T211125T Tan (Sheet 5 of 5)

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 03						
FIGURE 14. CHASSIS FRAME ASSEMBLY T211125G GREEN T211125T TAN						
1	PAFZZ	5310-01-563-4712	7JYX1	HW903-5011	NUT,SELF-LOCKING, HEXAGON.....	20
2	PAFZZ	5310-01-564-3319	7JYX1	T270280	WASHER,FLAT.....	20
3	PAFZZ	6220-01-552-6229	7JYX1	TG903-6768R	REFLECTOR,INDICATING, CLEARANCE.....	4
4	PAFZZ	5305-01-557-0241	7JYX1	1003103	SCREW,MACHINE.....	20
5	PAFZZ	6210-01-549-6409	7JYX1	TG903-6751	LIGHT,EMITTING DIODE....	2
6	XBFZZ		7JYX1	T211205G	LEG,STABILIZER.....	2
6	XBFZZ		7JYX1	T211205T	LEG,STABILIZER.....	2
7	PAFZZ	5310-01-553-0366	7JYX1	T270890	WASHER,LOCK.....	4
8	PAFZZ		7JYX1	T270539	SCREW,CAP,HEXAGON HEAD.....	4
9	PAFZZ		7JYX1	TG903-6771R	LAMP, MARKER/CLEARANCE, W/BRACKET & PIGTAIL.....	2
10	PAFZZ	5310-01-553-8822	7JYX1	T20018C	NUT,PLAIN,CONE SEAT, HEXAGON.....	16
11	XBFZZ		7JYX1	T210963B	WHEEL AND RUNFLAT (REFER TO TM 9-2330-392- 14&P FOR MAINTENANCE AND REPAIR PARTS).....	2
12	PAFZZ	9905-00-181-1080	7JYX1	TG903-6768Y	REFLECTOR,INDICATING, CLEARANCE.....	2
13	PAFZZ		7JYX1	TG903-6771Y	LAMP, MARKER/CLEARANCE, W/BRACKET & PIGTAIL.....	2
14	PAFZZ	5995-01-552-6936	7JYX1	TG903-6752	WIRING HARNESS.....	1
15	PAFZZ		7JYX1	T270844-8	SCREW,CAP,HEXAGON HEAD.....	4
16	XBFFF	2590-01-630-6256	7JYX1	PCHA0175G	TONGUE JACK ASSEMBLY GREEN (SEE FIGURE 16 FOR BREAKDOWN).....	1
16	XBFFF	2590-01-630-6252	7JYX1	PCHA0175T	TONGUE JACK ASSEMBLY TAN (SEE FIGURE 16 FOR BREAKDOWN).....	1
17	PAFZZ	5310-01-553-0357	7JYX1	T270860-8	NUT,SELF-LOCKING, HEXAGON.....	4

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
18	PAFZZ	2540-01-552-6428	7JYX1	T295153	TAILGATE WEB STRAP	1
19	PAFZZ	5305-01-553-8832	7JYX1	T270034	SCREW,MACHINE	3
20	PAFZZ	5210-01-516-7126	7JYX1	T210999	LEVEL,CYLINDRICAL, CIRCULAR,VIAL	1
21	PAFZZ		7JYX1	TG903-4604	HOOK,CLEVIS,SLIP	2
22	PAFZZ		7JYX1	T210965	CHAIN,SAFETY	2
23	PAFZZ	5315-01-558-6154	7JYX1	PCHA0171	PIN,LOCK	2
24	XBFZZ		7JYX1	TG404-0829G	GATE,RESTRAINT,FRONT CARGO,GREEN	1
24	XBFZZ		7JYX1	TG404-0829T	GATE,RESTRAINT,FRONT CARGO,TAN	1
25	XBFZZ		7JYX1	TG404-0830G	TAILGATE,GREEN	1
25	XBFZZ		7JYX1	TG404-0830T	TAILGATE,TAN	1
26	PAFZZ		7JYX1	1009474	PIN,QUICK RELEASE	10
27	PAFZZ	4010-01-481-1699	7JYX1	T270923	WIRE ROPE ASSEMBLY, SINGLE LEG,W/TAB	10
28	PAFZZ		7JYX1	TG903-2101	RIVET	10
29	PAFZZ	5975-00-878-3791	7JYX1	T220084	GROUND ROD, COMPLETE	1
30	PAFZZ	5310-01-533-2915	7JYX1	T270570	NUT,PLAIN,WING	1
31	PAFZZ	5310-01-569-5414	7JYX1	T270585	WASHER,FLAT	3
32	PAFZZ	5310-01-485-7896	7JYX1	T270555	NUT,PLAIN,HEXAGON	1
33	PAFZZ	5310-01-563-2566	7JYX1	T270595	WASHER,LOCK	1
34	PAFZZ	5305-01-569-5822	7JYX1	T270545	SCREW,CAP,HEXAGON HEAD	1
35	PAFZZ	5310-01-602-4140	7JYX1	1005375	NUT,SELF-LOCKING, HEXAGON	10
36	PAFZZ	5310-01-552-2776	7JYX1	T270380	WASHER,FLAT	10
37	PAFZZ		7JYX1	TG903-4512	CLIP,SPRING	1
38	PAFZZ	5306-01-535-6495	7JYX1	T270340	BOLT,MACHINE	1
39	PAFZZ	5340-01-476-7532	7JYX1	TG903-4512	CLAMP,LOOP	5
40	XBFZZ		7JYX1	T295154	BAR,CARGO NET	1
41	PAFZZ		0WFM3	TG903-6703	TUBING,PVC	2
42	XBFZZ		7JYX1	T210949G	BRACKET,MOUNTING, GREEN	1
42	XBFZZ		7JYX1	T210949	BRACKET,MOUNTING, TAN	1
43	PAFZZ		7JYX1	HW903-4048	BOLT,MACHINE	4
44	PAFZZ	5310-01-565-0280	7JYX1	T270560-8	NUT,SELF-LOCKING, HEXAGON	2

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
45	PAFZZ	5310-01-507-9756	7JYX1	T270580-8	WASHER,FLAT	2
46	PAFZZ		7JYX1	1003240	BOLT,MACHINE.....	2
47	PAFZZ	5340-01-267-2904	7JYX1	T210960	FASTENER,PAWL	2
48	XCFFF		7JYX1	TG421-9006G	BRAKE INSTALLATION, GREEN (SEE FIGURE 16 FOR BREAKDOWN)	1
48	XCFFF		7JYX1	TG421-9006G	BRAKE INSTALLATION, GREEN (SEE FIGURE 16 FOR BREAKDOWN)	1
49	XBFZZ		7JYX1	1009949	AXLE,COMPLETE REPLACEMENT,GREEN	1
49	XBFZZ		7JYX1	1009950	AXLE,COMPLETE REPLACEMENT,TAN.....	1
50	XBFZZ		7JYX1	1011659	A-FRAME ASSEMBLY, REPLACEMENT(NO AXLE),GREEN.....	1
50	XBFZZ		7JYX1	1011660	A-FRAME ASSEMBLY, REPLACEMENT (NO AXLE),TAN	1
51	XBFZZ		7JYX1	1013208	ALUMINUM STRUCTURE ASSEMBLY, REPLACEMENT,GREEN	1
51	XBFZZ		7JYX1	1013209	ALUMINUM STRUCTURE ASSEMBLY, REPLACEMENT,TAN.....	1
52	PAFZZ		7JYX1	T270846-8	SCREW,CAP,HEXAGON HEAD	12
53	PAFZZ		7JYX1	T270865-8	WASHER,FLAT	24
54	PAFZZ		7JYX1	T270860-8	NUT,SELF-LOCKING, HEXAGON	12
55	PAFZZ		7JYX1	T270882-8	WASHER,WEDGE	12
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
CHASSIS - TONGUE JACK ASSEMBLY DETAILS, PCHA0175G, PCHA0175T

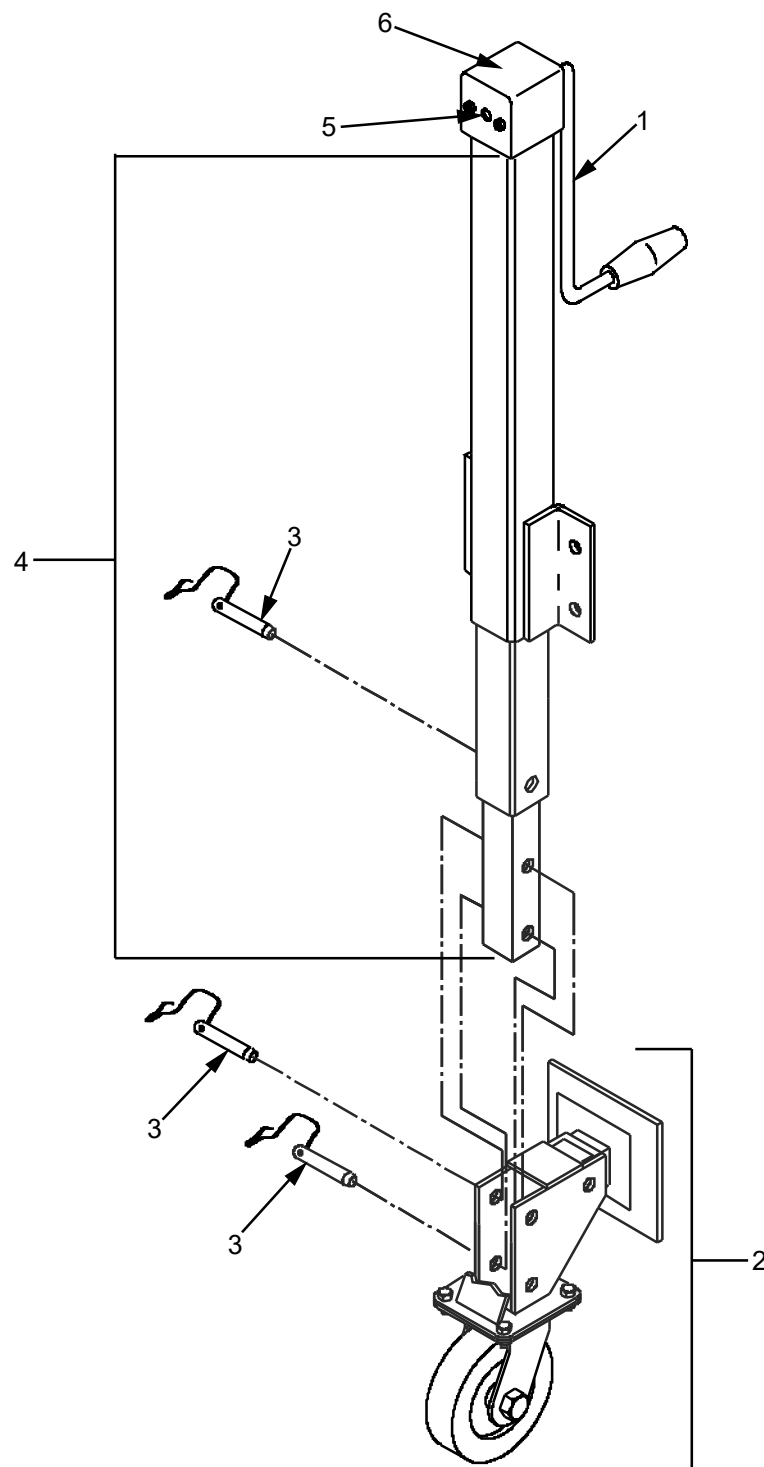


Figure 15. Chassis - Tongue Jack Assembly Details, PCHA0175G, PCHA0175T.

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 0301						
FIGURE 15 CHASSIS, TONGUE JACK ASSEMBLY PCHA0175G GREEN PCHA0175T TAN						
	XBFFF	2590-01-630-6256	7JYX1	PCHA0175G	TONGUE JACK ASSEMBLY GREEN	1
	XBFFF	2590-01-630-6252	7JYX1	PCHA0175T	TONGUE JACK ASSEMBLY TAN	1
1	PAFZZ	5340-01-533-2190	7JYX1	1000562	HANDLE,CRANK	1
2	XBFZZ		7JYX1	PCHA0131G	WHEEL/SKID PLATE ASSEMBLY,SINGLE WHEEL,GREEN	1
2	XBFZZ		7JYX1	PCHA0131T	WHEEL/SKID PLATE ASSEMBLY,SINGLE WHEEL,TAN	1
3	PAFZZ		7JYX1	TG404-0902	PIN,W/SAFETY CLIP	3
4	XBFZZ		7JYX1	PCHA0130G	EXTENSION ASSEMBLY, GREEN (INCL JACK, EXTENSION TUBE & PIN)	1
4	XBFZZ		7JYX1	PCHA0130T	EXTENSION ASSEMBLY, TAN (INCL JACK, EXTENSION TUBE & PIN)	1
5	PAFZZ		7JYX1	1000563	KIT,GEAR REPLACEMENT	1
6	PAFZZ		7JYX1	1009827	COVER,JACK ASSEMBLY, GREEN	1
6	PAFZZ		7JYX1	1009828	COVER,JACK ASSEMBLY, TAN	1
END OF FIGURE						

PARTS INFORMATION
HP-2C/185 UST Trailer
CHASSIS - BRAKE INSTALLATION, TG421-9006G, TG421-9006T

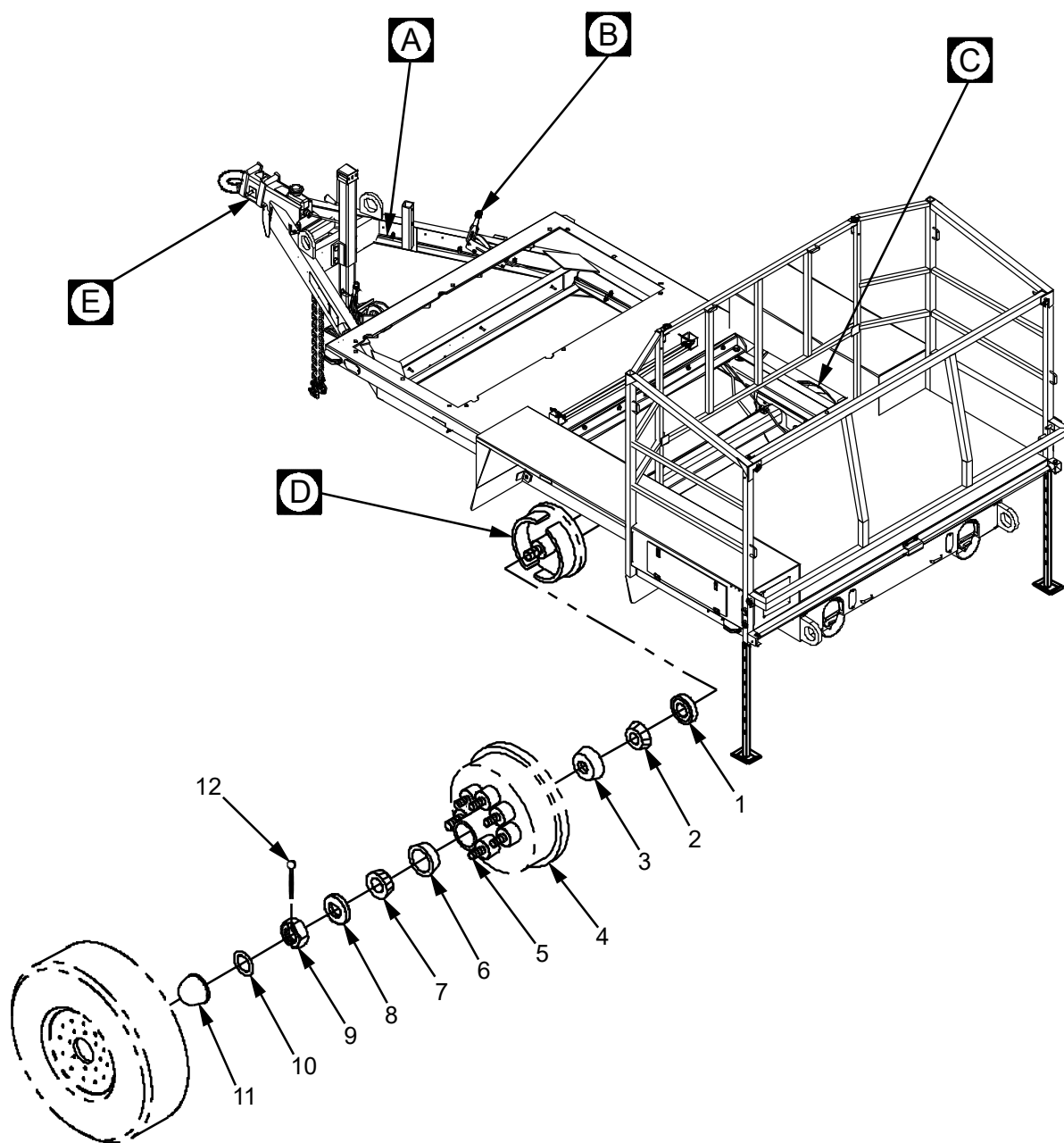


Figure 16. Chassis - Brake Installation, TG421-9006G, TG421-9006T (Sheet 1 of 5).

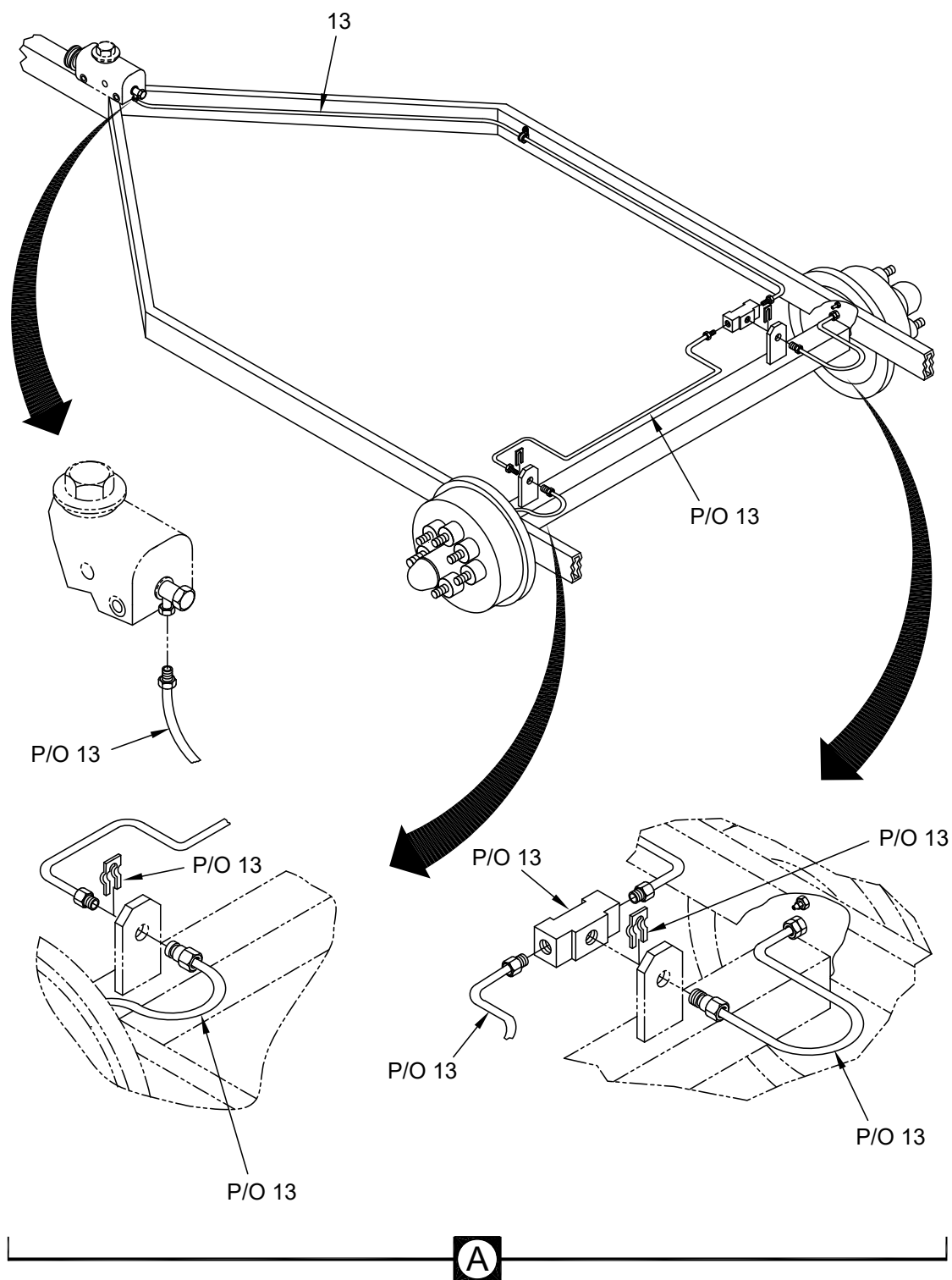


Figure 16. Chassis - Brake Installation, TG421-9006G, TG421-9006T (Sheet 2 of 5).

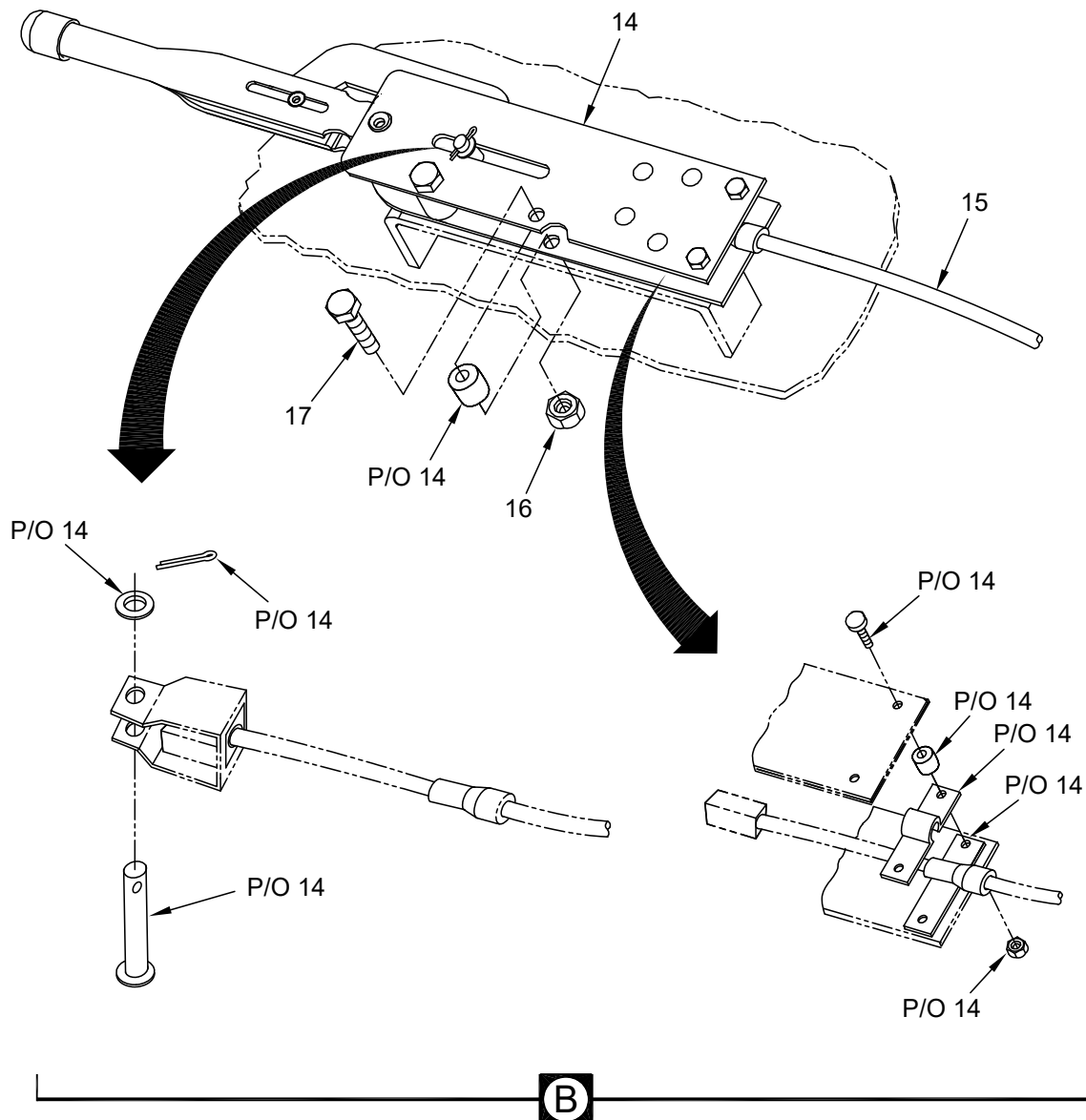


Figure 16. Chassis - Brake Installation, TG421-9006G, TG421-9006T (Sheet 3 of 5).

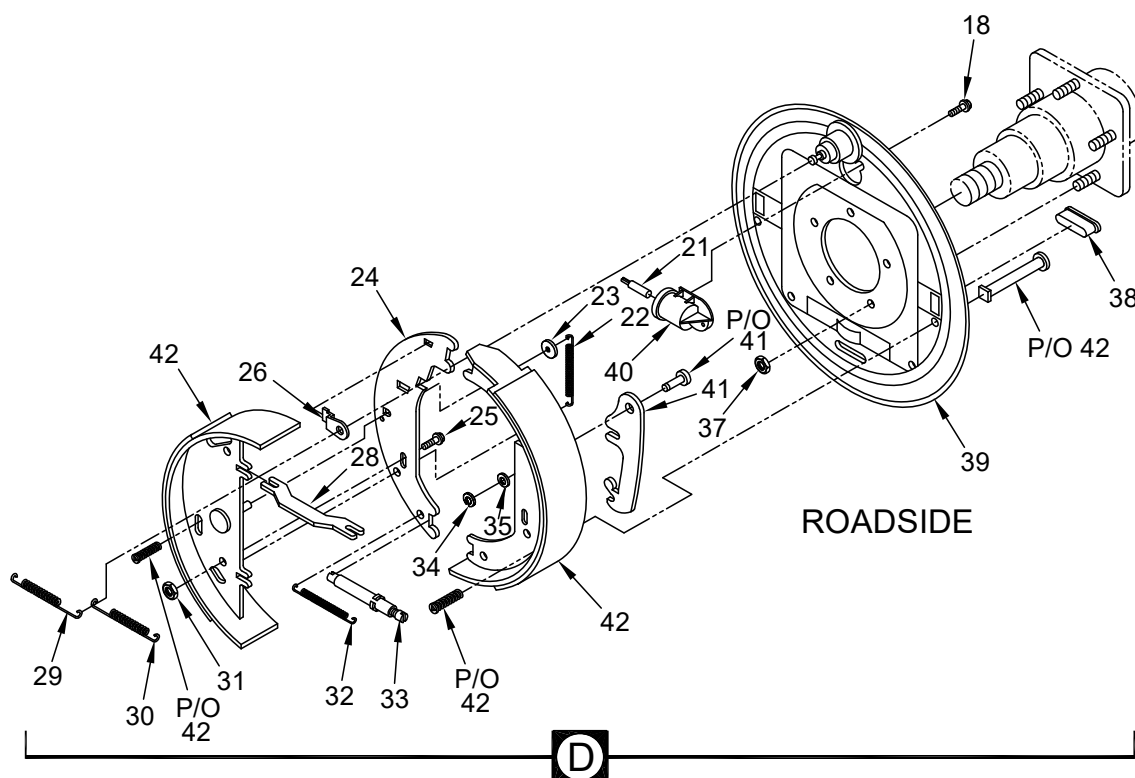
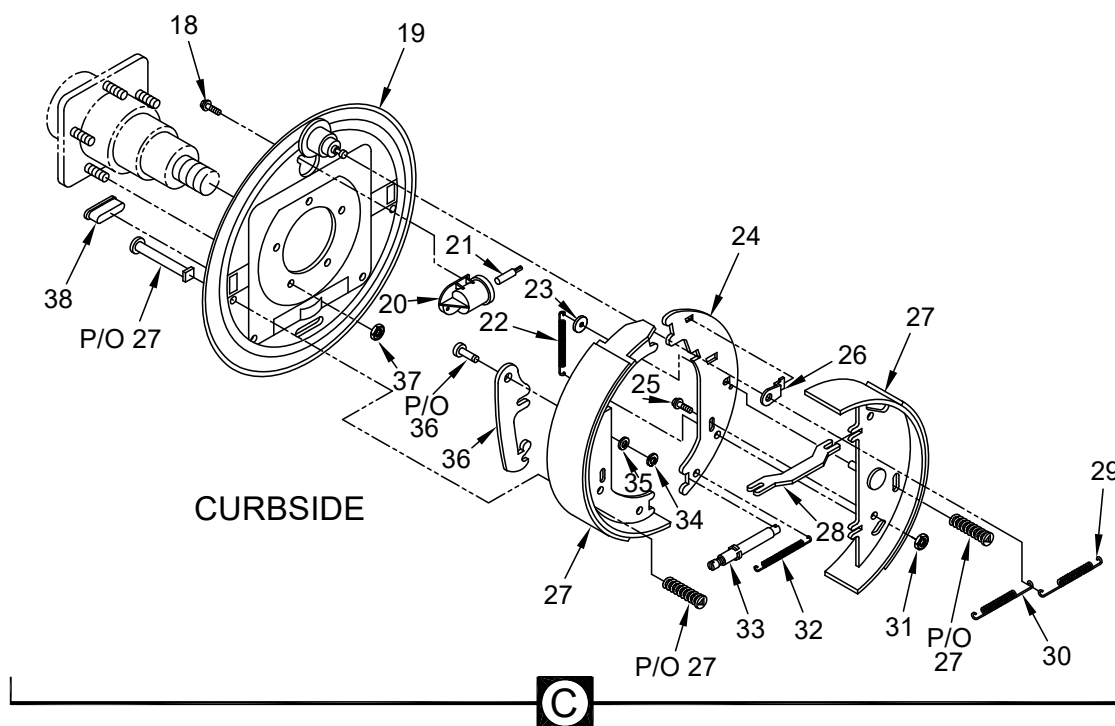


Figure 16. Chassis - Brake Installation, TG421-9006G, TG421-9006T (Sheet 4 of 5).

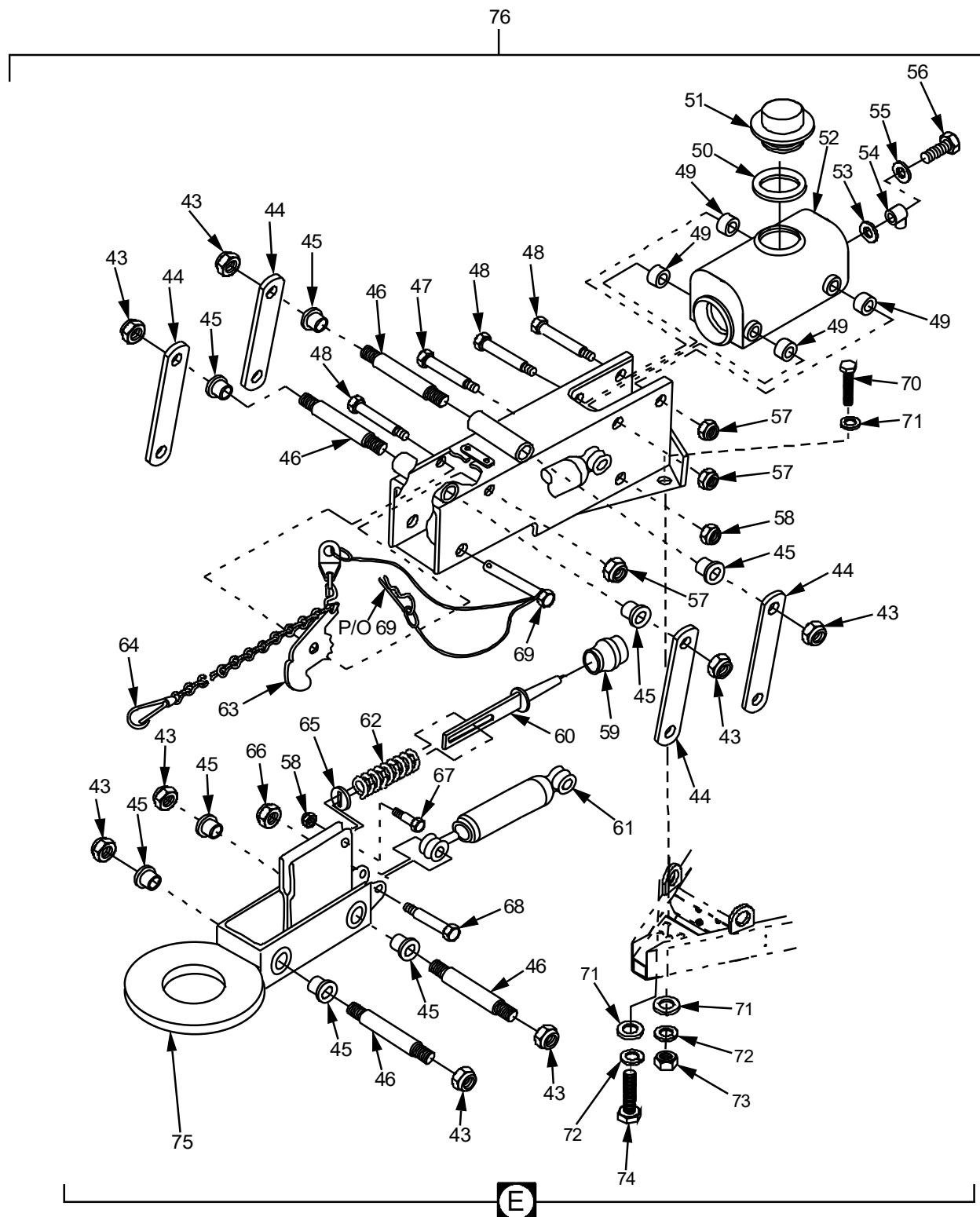


Figure 16. Chassis - Brake Installation, TG421-9006G, TG421-9006T (Sheet 5 of 5).

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
GROUP 0302						
FIGURE 16. CHASSIS, BRAKE INSTALLATION TG421-9006G GREEN TG421-9006T TAN						
1	PAFZZ		7JYX1	TG903-6101-1	SEAL,GREASE	2
2	PAFZZ	3110-00-100-3541	7JYX1	TG903-6101-2	CONE & ROLLER, TAPERED ROLLER BEARING	2
3	PAFZZ	3110-01-524-7337	7JYX1	TG903-6101-4	RING,BEARING,INNER	2
4	PAFZZ	1630-01-570-4484	7JYX1	1000909	BRAKE DRUM	2
5	PAFZZ	5307-01-554-0463	7JYX1	T20028C	STUD,SELF-LOCKING	16
6	PAFZZ	3110-00-100-0516	7JYX1	TG903-6101-3	CUP,TAPERED ROLLER BEARING	2
7	PAFZZ	3110-01-550-0132	7JYX1	TG903-6101-5	CONE,TAPERED ROLLER BEARING	2
8	PAFZZ	5310-01-533-1836	7JYX1	1000910	WASHER,FLAT	2
9	PAFZZ	5310-01-455-4394	7JYX1	1000911	NUT,PLAIN HEXAGON.....	2
10	PAFZZ	5331-01-524-8032	7JYX1	1000912	O-RING.....	2
11	PAFZZ	2530-01-192-8464	7JYX1	TG903-3203	CAP,GREASE	2
12	PAFZZ	5315-01-519-8470	7JYX1	1000735	PIN,COTTER.....	2
13	XBFZZ	2510-01-609-6729	7JYX1	TG903-6704	BRAKE LINE KIT,TORSION	1
14	XBFZZ		7JYX1	T210911	HANDBRAKE,MANUAL	2
15	PAFZZ	2530-01-606-3956	7JYX1	TG903-5103	CABLE,ACTUATING, HANDBRAKE	2
16	PAFZZ	5310-01-565-0280	7JYX1	T270560	NUT,SELF-LOCKING HEXAGON	4
17	PAFZZ	5305-01-558-7717	7JYX1	T270547	SCREW,CAP,HEXAGON HEAD.....	4
18	PAFZZ	5305-01-521-8564	7JYX1	TG903-6217	SCREW,CAP,HEXAGON HEAD.....	4
19	XBFZZ		7JYX1	TG903-6293	BRAKE,BACKING PLATE ASSEMBLE,RIGHT SIDE	1
20	PAFZZ	2530-01-375-8150	7JYX1	TG903-6295	CYLINDER ASSEMBLY, HYDRAULIC BRAKE, WHEEL, RIGHT SIDE	1
21	PAFZZ	2530-01-522-0151	7JYX1	TG903-6275	PUSH ROD,HYDRAULIC BRAKE MASTER CYLINDER	2
22	PAFZZ	5360-01-569-6048	7JYX1	TG903-6254	SPRING,PRIMARY SHOE, RETURN.....	2
23	PAFZZ	5310-01-569-5989	7JYX1	TG903-6230	WASHER,FLAT	2

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
24	PAFZZ	2530-01-609-9805	7JYX1	TG903-6220	LEVER,BRAKE SHOE	2
25	PAFZZ	5305-01-569-5976	7JYX1	TG903-6229	SCREW,SHOULDER	2
26	PAFZZ	2530-01-569-5950	7JYX1	TG903-6218	LINK,ANCHOR,BRAKE SHOE	2
27	PAFZZ	2530-01-552-7040	7JYX1	TG903-6250	BRAKE SHOE,RIGHT SIDE	1
28	PAFZZ	2530-01-461-0178	7JYX1	TG903-6235	LINK,ANCHOR,BRAKE SHOE	2
29	PAFZZ	5360-01-569-6055	7JYX1	TG903-6253	SPRING,HELICAL, EXTENSION.....	2
30	PAFZZ	5360-01-569-6046	7JYX1	TG903-6277	SPRING,RETRACTOR	2
31	PAFZZ	5310-01-569-5955	7JYX1	TG903-6228	NUT,SELF-LOCKING.....	2
32	PAFZZ	5360-01-569-6043	7JYX1	TG903-6280	SPRING ADJUSTER SCREW, BRAKE	2
33	PAFZZ	2530-01-456-9099	7JYX1	TG903-6223	ADJUSTING SCREW ASSEMBLY,BRAKE	2
34	PAFZZ	5340-01-454-6358	7JYX1	TG903-6232	CLIP,SPRING TENSION.....	2
35	PAFZZ	5310-01-454-2325	7JYX1	TG903-6296	WASHER,SPRING TENSION	2
36	PAFZZ	2530-01-456-9107	7JYX1	TG903-6234	LINK,PARKING BRAKE CONNECTING,RIGHT SIDE	1
37	PAFZZ	5310-01-569-5984	7JYX1	TG903-6226	NUT,PLAIN,HEXAGON.....	10
38	PAFZZ	5340-01-535-4672	7JYX1	TG903-6281	PLUG,PROTECTIVE,DUST AND MOISTURE SEAL.....	2
39	XBFZZ		7JYX1	TG903-6273	BRAKE,BACKING PLATE ASSEMBLY,LEFT SIDE	1
40	PAFZZ	2530-01-375-8149	7JYX1	TG903-6294	CYLINDER ASSEMBLY, HYDRAULIC BRAKE, WHEEL, LEFT SIDE	1
41	PAFZZ	2530-01-457-0173	7JYX1	TG903-6233	LINK,PARKING BRAKE CONNECTING,LEFT SIDE ..	1
42	PAFZZ	2530-01-552-7044	7JYX1	TG903-6249	BRAKE SHOE,LEFT SIDE...	1
43	PAFZZ	5310-00-877-5795	7JYX1	1001409	NUT,SELF- LOCKING,HEXAGON	8
44	PAFZZ	2540-01-051-6355	7JYX1	1005629	LINK,CHAIN	4
45	PAFZZ	3120-01-052-1151	7JYX1	1009816	BEARING,SLEEVE	8
46	PAFZZ	2540-01-051-6354	7JYX1	1008917	SHAFT,CHAIN	4
47	PAFZZ	5305-00-710-4205	7JYX1	1001260	SCREW,CAP,HEXAGON HEAD.....	1
48	PAFZZ	5305-00-709-8423	7JYX1	1001261	SCREW,CAP,HEXAGON HEAD.....	3
49	PAFZZ	5365-01-053-6898	7JYX1	1009834	SPACER,SLEEVE.....	4
50	PAFZZ	5330-00-291-6658	7JYX1	T210918	GASKET	1
51	PAFZZ		7JYX1	1009832	CAP,FILLER OPENING, GREEN.....	1

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
51	PAFZZ		7JYX1	1009833	CAP,FILLER OPENING, TAN	1
52	PAFZZ	2530-01-050-8929	7JYX1	1009838	CYLINDER ASSEMBLY, HYDRAULIC BRAKE	1
53	PAFZZ	5310-00-275-6635	7JYX1	1009836	WASHER, FLAT	1
54	PAFZZ	5340-01-570-9063	7JYX1	1002766	CONNECTOR	1
55	PAFZZ	5310-00-209-1761	7JYX1	1009835	WASHER,FLAT	1
56	PAFZZ	4730-01-053-8468	7JYX1	1009837	BOLT,FLUID PASSAGE	1
57	PAFZZ	5310-00-959-1488	7JYX1	1001262	NUT,SELF- LOCKING,HEXAGON	3
58	PAFZZ	5310-00-057-7080	7JYX1	1001263	NUT,SELF- LOCKING,HEXAGON	2
59	PAFZZ	5340-01-456-6458	7JYX1	1009844	BOOT,DUST AND MOISTURE SEAL	1
60	PAFZZ	2530-01-167-1999	7JYX1	1009839	PUSH ROD,HYDRAULIC BRAKE MASTER	1
61	PAFZZ	2510-01-050-7136	7JYX1	TG903-6203	SHOCK ABSORBER, DIRECT ACTION	1
62	PAFZZ	5360-01-054-2281	7JYX1	1009840	SPRING.....	1
63	PAFZZ	2530-01-050-7698	7JYX1	1009841	LEVER BREAKAWAY	1
64	PAFZZ	5340-01-385-9852	7JYX1	1009842	SNAP,HOOK.....	1
65	PAFZZ	5310-01-050-8832	7JYX1	1009843	WASHER,PUSH ROD.....	1
66	PAFZZ	5310-00-074-2328	7JYX1	1001265	NUT,SELF-LOCKING, HEXAGON	1
67	PAFZZ	5305-00-949-6184	7JYX1	1001266	SCREW,SHOULDER.....	1
68	PAFZZ	5305-00-709-8452	7JYX1	1001267	SCREW,CAP,HEXAGON HEAD.....	1
69	PAFZZ	5315-01-567-5347	7JYX1	1001136	PIN,LOCKING	1
70	PAFZZ	5306-01-503-8991	7JYX1	HW903-4019	BOLT,HEXAGON HEAD	2
71	PAFZZ	5310-01-559-0602	7JYX1	T270780	WASHER,FLAT	6
72	PAFZZ	5310-01-598-5134	7JYX1	T270790	WASHER,SPLIT,LOCK.....	4
73	PAFZZ		7JYX1	HW903-5004	NUT,SELF-LOCKING, HEXAGON	2
74	PAFZZ		7JYX1	HW903-3012	SCREW,CAP,HEXAGON HEAD.....	2
75	PAFZZ		7JYX1	1009945	COUPLER,DRAWBAR RING,GREEN	1
75	PAFZZ		7JYX1	1009946	COUPLER,DRAWBAR RING,TAN	1

(1) ITEM NO	(2) SMR CODE	(3) NSN	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION AND USABLE ON CODE (UOC)	(7) QTY
76	PAFZZ		7JYX1	1002330	ACTUATOR, FIELD REPLACEMENT, W/ 3" PINTLE, GREEN	1
76	PAFZZ		7JYX1	1002331	ACTUATOR, FIELD REPLACEMENT, W/ 3" PINTLE, TAN	1
END OF FIGURE						

CHAPTER 10

DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE

FOR

HP-2C/185 UST Trailer

**DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE
HP-2C/185 UST Trailer
GENERAL INFORMATION**

SCOPE

This work package is for guidance of those whose duty it is to render inoperable or destroy equipment which is in imminent danger of capture by an enemy.

AUTHORIZATION

Only division or higher commanders have the authority to order destruction of equipment. They may however, delegate this authority to subordinate commanders when the situation demands it.

REPORTING DESTRUCTION

Destruction of equipment will be reported through command channels.

METHODS OF DESTRUCTION

Choose methods of destruction which will cause such damage that it will be impossible to restore the equipment to a usable condition within the combat zone. The following methods of destruction may be used separately or in combination, depending on the type of equipment and the degree to which each method is used.

Self-Destruction

Built-in self-destruction devices should be set off even if the major item containing equipment with self-destruction devices is to be destroyed. These devices should be permitted to do their work at least partially before incendiaries or explosives (especially the latter) are set off. Currently, the HP-2C/185 UST Trailer contains no built-in self-destruction devices.

Improper Operation

The short circuiting of a power source and the application of an over voltage to equipment are examples of improper operation. This method of destruction has a limited application to electronics material.

Fire

The starting of fires on or near electronic equipment is particularly useful in destroying predominantly nonmetallic components such as transistors, diodes, resistors, capacitors, switches, and printed circuit boards. Fires should be lit after setting off explosives and/or completing mechanical destruction. Fires within partially closed cabinets tend to be less effective than open fires, since a closed area does not allow sufficient oxygen necessary for an intense flame. Heat sources which do not require an air supply, such as thermite-based devices or incendiary grenades, are not subject to this limitation. The use of fire is associated with numerous hazards, including the possibility of disclosing positions which are under enemy visual or infrared surveillance.

Weapons Fire

The use of weapons fire is less desirable than mechanical destruction, and is practically useless against heavy gauge metal panels and metal castings. However, optics such as night observation equipment are easily destroyed by correctly aimed gunfire.

Demolition (Explosives)

Explosives refer to TNT, plastic explosives, as well as fragmentation grenades. Explosives are most effective against structures and components which will not burn, or are too heavy or too strong to be easily demolished by mechanical means. The use of explosives has the disadvantage of possible disclosure of position when enemy forces are using sound-ranging-type equipment.

Mechanical Destruction

Mechanical destruction includes smashing electronic components, bending chassis or sub chassis, slashing cables and wiring, or any similar action. Dropping a weight on equipment and throwing lightweight equipment over a cliff are also examples of mechanical destructions. Sledges, hammers, axes or heavy tools are examples of the implements which can be used. Mechanical destruction should be completed before fires are lit.

Use of Natural Surroundings

The disposal or denial to the enemy of electronics material may be accomplished in the field by taking advantage of the natural surroundings and environment.

Submergence of equipment and repair parts under water (lakes, ponds, streams, etc), concealment by hiding material in caves or, preferably burial can be used effectively. Where the surrounding area does not lend itself to such disposal, widely dispersed scattering of material, preferably, into heavy underbrush, can serve as a denial or delaying measure in the event the area is recaptured.

CLASSIFIED EQUIPMENT

Classified equipment must be destroyed to such a degree as to prevent duplication by, or revealing means of operation or function to the enemy.

ASSOCIATED CLASSIFIED DOCUMENTS

Any classified documents, notes, instructions, or other written material pertaining to function, operation, maintenance, or employment, including drawings or parts lists, must be destroyed in a manner to render them useless to the enemy.

END OF WORK PACKAGE

**DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE
HP-2C/185 UST Trailer
DESTRUCTION PROCEDURES**

SCOPE

This work package is for guidance of those whose duty it is to render inoperable or destroy the HP-2C/185 UST Trailer which is in imminent danger of capture by an enemy.

METHOD OF DESTRUCTION

Command decision, according to the tactical situation will determine when the using organization is to destroy an HP-2C/185 UST Trailer. A destruction plan will be prepared by the using organization, unless one was prepared by a higher authority. For general vehicle destruction procedures, refer to TM 750-244-6, Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use (U.S. Army Tank-Automotive and Artillery Command).

HP-2C/185 UST Trailer EQUIPMENT DESTRUCTION PROCEDURES

The following procedures should be followed when time does not permit critical equipment to be destroyed individually.

Demolition/Explosives**WARNING**

Personnel should stand clear of area being destroyed by weapons fire. Always use a weapon of a caliber sufficient to ensure enough penetration to achieve the desired damage and to eliminate the possibility of ricochet. Personnel unfamiliar with explosives should not set or detonate explosives.

The use of explosives has the disadvantage of possible disclosure of position.

The HP-2C/185 UST Trailer can be destroyed using incendiary grenades, several rounds of properly aimed weapons fire, or a sufficient amount of explosives. When placing explosives, they should be placed within the Genset and ECU enclosures and under the HP-2C/185 UST Trailer.

Use incendiary grenade by pulling pin and placing directly on top of engine and/or generator and on top of ECU compressor.

Additional charges can be placed on the trailer tongue, on top of the chassis frame, and on the axle to prevent enemy use of the trailer.

Puncture trailer tires and remove trailer lunette assembly.

WARNING

Toxic fumes may result from burning electrical equipment found in the Genset and ECU. Fires should be lit only in open areas. Avoid inhaling fumes from burning components.

Fire

Fires should be started after setting off explosives. Gasoline, kerosene, diesel, or oil may be used to destroy smaller components and accessories.

END OF WORK PACKAGE

CHAPTER 11

SUPPORTING INFORMATION

FOR

HP-2C/185 UST Trailer

SUPPORTING INFORMATION
HP-2C/185 UST Trailer
REFERENCES

SCOPE

This work package lists all field manuals, forms, military standards, technical manuals, and miscellaneous publications referenced in this manual

FIELD MANUALS

FM 3-5	NBC Decontamination
FM 4-25.11	First Aid
FM 21-305	Manual for the Wheeled Vehicle Driver

GOVERNMENT PUBLICATIONS

AR 25-2	Information Assurance
AR 700-138	Army Logistics Readiness and Sustainability
CECOM TR-98-6	Earth Grounding and Bonding Pamphlet
DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Forms 2404 and 5988E	Equipment Inspection and Maintenance Worksheet
DA Form 2408-9	Equipment Control Record.
DA Form 7399	Survey/Decontamination Record
DA Form 7399-R	Survey/Decontamination Record
DA Form 7400	Record of Area/Equipment Survey
DA Form 7401	Radioactive Commodity Report
DA PAM 700-48	Handling Procedures for Equipment Contaminated with Depleted Uranium or Radioactive Commodities
DA PAM 700-138	Army Logistics Readiness and Sustainability
DA PAM 750-8	The Army Maintenance Management System (TAMMS) Users Manual
DA PAM 738-751	Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS-A)
DD Form 361	Transportation Discrepancy Report
SF 368	Product Quality Deficiency Report

TECHNICAL BULLETINS

TB 43-0134	Technical Bulletin Battery Disposition and Disposal
TB MED 507.....	Heat Stress Control and Heat Casualty Management

TECHNICAL MANUALS

TM 11-5820-1118-12&P.....	Operator and Unit Maintenance Manual (including Repair Parts and Special Tools List) MK-2551A/U (SWGS) Grounding Kit
TM 9-2330-392-14&P.....	Operator's, Unit, Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools List) Trailer, Cargo: Light, 2-Wheel M1101 (2330-01-387-5443) EIC: CBC; Trailer, Cargo: Heavy, 2-Wheel M1102 (2330-01-387-5426) EIC: CBB; Chassis, Trailer: 2-Wheel (2330-01-387-5424) EIC: CCL
TM 750-244-2.....	Procedures for Destruction of Electronic Material to Prevent Enemy Use
TM 750-244-6.....	Procedures for Destruction of Tank Automotive Equipment to Prevent Enemy Use (US Army Tank-Automotive Command)

END OF WORK PACKAGE

MAINTAINER MAINTENANCE INSTRUCTIONS

HP-2C/185 UST Trailer

TORQUE SPECIFICATIONS FOR GENSET AND CHASSIS MAINTENANCE

GENERAL

This section provides general torque limits for bolts used on the HP-2C/185 UST Trailer. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this work package shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to bolts that retain rubber components. The rubber components will be damaged before the correct torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the bolt or nut until it touches the metal bracket, then tighten it one more turn.

TIGHTENING METAL FASTENERS

When torquing a fastener, select a torque wrench that's range fits the required torque value. A torque wrench is most accurate from 25 percent to 75 percent of its stated range. A torque wrench with the stated range of 0 to 100 will be most accurate from 25 to 75 foot-pounds. The accuracy of readings will decrease as you approach 0 foot-pounds or 100 foot-pounds. The ranges are based on this principle.

CONVERSION TABLES

Because much of the hardware used on the engine for the Genset is metric. It may be necessary to convert the torque requirements from metric [Newton-meters (N-m) or Kilogram meters (kgf)] to English (Foot Pounds).

TORQUE LIMITS

Table 3 lists torque limits for standard *metric* bolts. Table 4 lists torque limits for flanged *metric* bolts.

HOW TO USE TORQUE TABLES

1. Measure the diameter of the bolt to be installed.

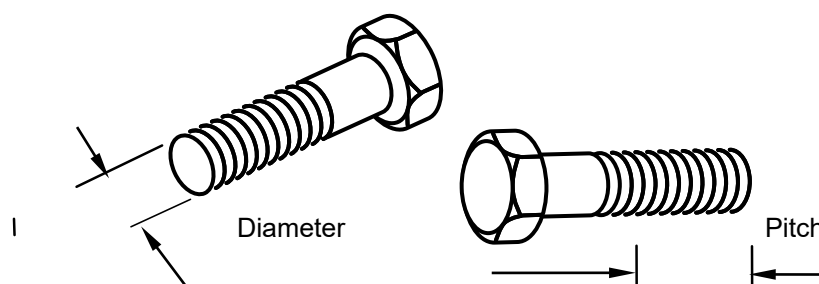


Figure 1. Bolt Diameter and Thread Pitch.

2. Count the number of threads per inch or use a pick gauge.
3. Under the heading SIZE, look down the left hand column until the diameter of bolt to be installed is found (there will usually be two lines beginning with the same size).
4. In the second column under SIZE, find the number of threads per inch that matches the number of threads counted in step 2.

COMPONENT SPECIFIC TORQUE LIMITS

Table 1 lists torque limits for specific components of the HP-2C/185 UST Trailer. These torque limits are also listed in their associated WPs.

Table 1. Component Torque Specifications.

Engine Component		Torque Requirements			Work Package
		lb. ft	N-m	kgf-m	
Alternator Mounting Bolts		14~21	19~28	1.9~2.9	0067
Alternator Bracket Hinge Bolt		25~34	34~46	3.5~4.7	0067
Brakes	Cap screws	12.58~15.42	17.1~20.9	1.74~2.13	0125
	Backing plate	45~55	62~76	6.32~7.75	0125
	Pre brake adjustment	12.75~15.58	17.1~20.9	1.74~2.13	0125
	Post brake adjustment	16.5~20.16	21.6~26.4	2.2~2.69	0125
Coolant Temperature Sensor		9~13	12~18	1.2~1.8	0062
Coolant Temperature Switch		9~13	12~18	1.2~1.8	0063
Exhaust Manifold Bolts		14~21	19~28	1.9~2.9	0073
Fan blade		17.4	23.5	2.4	0069
Fuel injector	Hold-down bolt	23~30	31~41	3.2~4.2	0058
	injector line hardware	11~18	19~28	1.9~2.9	0058
	pump hardware	14~21	19~28	1.9~2.9	0058
	Injector rail bolts	7~10	10~14	1.0~1.4	0058
	Injector pump rail bolts	15~18	20~25	2.0~2.5	0058
Generator	Alignment studs	35~40	47.45~54.23	4.84~5.53	0123
	Flex plate mounting bolts	17~20	23.05~27.11	2.35~2.76	0123
	Generator mounting bolts	35~40	47.45~54.23	4.84~5.53	0123
	Metal grille	7~10	9.49~13.55	0.97~1.38	0123
Engine Mounting nuts (4 ea.)		51	69.15	7.05	0123
Glow Plug		11~14	15~20	1.5~2.0	0051
Starter Bolts		93~113	69~83	9.5~11.5	0060
Thermostat housing		14~21	19~28	1.9~2.9	0064
Tire and Wheel Assembly		95~105	129~143	13.2~14.6	0080
Water Pump		14~21	19~28	1.9~2.9	0070

GENERAL TORQUE REQUIREMENTS

NOTE

The torque specifications in Table 2 and Table 3 apply only when other torque specifications are not stated in the procedure.

The asterisk (*) indicates that bolts are used for female threaded parts that are made of soft materials.

Table 2. Flanged Head Bolt Torque Specifications.











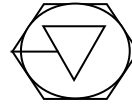






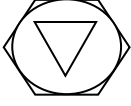
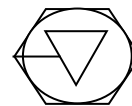
Bolt Identification						
	N-m	kgf m	N-m	kgf m	N-m	kgf m
M6 x	4.6~8.5	0.5~0.9	6.6~12.2	0.6~1.2		
M8 x 1.25	10.5~19.6	1.1~2.0	151.3~28.4	1.6~2.9	18.1~33.6	2.1~3.4
M10 x 1.25	23.1~38.5	2.4~3.9	35.4~58.9	3.6~6.1	42.3~70.5	4.3~7.2
*M10 x 1.5	22.3~37.2	2.3~3.8	34.5~57.5	3.5~5.8	40.1~66.9	4.1~6.8
M12 x 1.5	54.9~82.3	5.6~8.4	77.7~117.0	77.9~11.9	85.0~128.0	8.7~13.0
*M12 x 1.25	51.0~76.5	5.2~7.8	71.4~107.0	7.3~10.9	79.5~119.0	8.1~12.2
M14 x 1.5	83.0~125.0	8.5~12.7	115~172.0	11.7~17.6	123.0~188.0	12.6~18.9
*M14 x 2.0	77.2~116.0	7.9~11.8	108.0~162.0	11.1~16.6	116.0~173.0	11.8~17.7
M16 x 1.5	116.0~173.0	11.8~17.7	171.0~257.0	17.4~26.2	117.0~165.0	18.0~27.1
*M16 x 2.0	109.0~164.0	11.2~16.7	163.0~244.0	16.6~24.9	169.0~253.0	17.2~25.8

Table 3. Standard Bolt Torque Specifications.

Bolt Identification			 			
			 			
Bolt Dia x Pitch (mm)	N-m	kgf m	N-m	kgf m	N-m	kgf m
M6 x	3.9~7.8	0.4~0.8	4.9~9.8	0.5~1.0		
M8 x 1.0	7.8~17.7	0.8~1.8	11.8~22.6	1.2~2.3	16.7~30.4	1.7~3.1
M10 x 1.25	20.6~34.3	2.1~3.5	27.5~46.1	2.8~4.7	37.3~62.8	3.8~6.4
*M10 x 1.5	19.6~33.4	2.0~3.4	27.5~45.1	2.8~4.6	36.3~59.8	3.7~6.1
M12 x 1.5	49.1~73.6	5.0~7.5	60.8~91.2	6.2~9.3	75.5~114.0	7.7~11.6
*M12 x 1.25	45.1~68.7	4.6~7.0	56.9~84.4	5.8~8.6	71.6~107.0	7.3~10.9
M14 x 1.5	76.5~115.0	7.8~11.7	93.2~139.0	9.5~14.2	114.0~171.0	11.6~17.4
*M14 x 2.0	71.6~107.0	7.3~10.9	88.3~131.0	9.0~13.4	107.0~160.0	10.9~16.3
M16 x 1.5	104.0~157.0	10.6~16.0	135.0~204.0	13.8~20.8	160.0~240.0	19.3~24.5
*M16 x 2.0	100.0~149.0	10.2~15.2	129.0~194.0	13.2~19.8	153.0~230.0	15.6~23.4
M18 x 2.0	151.0~226.0	15.4~23.0	195.0~293.0	19.9~29.9	230.0~345.0	23.4~35.2
*M18 x 2.5	151.0~226.0	15.4~23.0	196.0~294.0	20.0~30.0	231.0~346.0	23.6~35.3

GENERAL TORQUE REQUIREMENTS – Continued

Table 3. Standard Bolt Torque Specifications - Continued.

Bolt Identification			 			
			 			
Bolt Dia x Pitch (mm)	N-m	kgf m	N-m	kgf m	N-m	kgf m
M20 x 1.5	206.0~310.0	21.0~31.6	270.0~405.0	27.5~41.3	317.0~476.0	32.3~48.5
*M20 x 2.5	190.0~286.0	19.4~29.2	249.0~375.0	25.4~38.2	293.0~440.0	29.9~44.9
M22 x 1.5	251.0~414.0	25.6~42.2	363.0~544.0	37.0~55.5	425.0~637.0	43.3~64.9
*M22 x 2.5	218.0~328.0	22.2~33.4	338.0~507.0	34.5~51.7	394.0~592.0	40.2~60.4
M24 x 2.0	359.0~540.0	36.6~55.0	431.0~711.0	43.9~72.5	554.0~831.0	56.5~84.7
*M24 x 3.0	338.0~507.0	34.5~51.7	406.0~608.0	41.4~62.0	521.0~782.0	53.1~79.7

CONVERSION TABLES

Table 4. Newton-Meters to Kilogram-Meters.

n-m	0	10	20	30	40	50	60	70	80	90
----	kgf-m	kgf-m	kgf-m	kgf-m	kgf-m	kgf-m	kgf-m	kgf-m	kgf-m	kgf-m
----	----	1.020	2.039	3.059	4.079	5.099	6.118	7.138	8.158	9.177
100	10.197	11.217	12.236	13.256	14.276	15.296	16.315	17.335	18.355	19.374
200	20.394	21.414	22.433	23.453	24.473	25.493	26.512	27.532	28.552	29.571
300	30.591	31.611	32.630	33.650	34.670	35.690	36.709	37.729	38.749	39.768
400	40.788	41.808	42.827	43.847	44.867	45.887	46.906	47.926	48.946	49.965
500	50.985	52.005	53.024	54.044	55.064	56.084	57.103	58.123	59.143	60.162
600	61.182	62.202	63.221	64.241	65.261	66.281	67.300	68.320	69.340	70.359
700	71.379	72.399	73.418	74.438	75.458	76.478	77.497	78.517	79.537	80.556
800	81.576	82.596	83.615	84.635	85.655	86.675	87.694	88.714	89.734	90.753
900	91.773	92.793	93.812	94.832	95.852	96.872	97.891	98.911	99.931	100.950
1000	101.970	102.990	104.009	105.029	106.049	107.069	108.088	109.108	110.128	111.147

Table 5. Kilogram-Meters to Foot Pounds.

kgf-m	0	1	2	3	4	5	6	7	8	9
----	ft. lbs	ft. lbs	ft. lbs	ft. lbs	ft. lbs	ft. lbs	ft. lbs	ft. lbs	ft. lbs	ft. lbs
----	----	7.23	14.47	21.70	28.93	36.17	43.40	50.63	57.86	65.10
10	72.33	79.56	86.80	94.03	101.26	108.50	115.73	122.96	130.19	137.43
20	144.66	151.89	159.13	166.36	173.59	180.83	188.06	195.29	202.52	209.76
30	216.99	224.22	231.46	238.69	245.92	253.16	260.39	267.62	274.85	282.09
40	289.32	296.55	303.79	311.02	318.25	325.49	332.72	339.95	347.18	354.42
50	361.65	368.88	376.12	383.35	390.58	397.82	405.05	412.28	419.51	426.75
60	433.98	441.21	448.45	455.68	462.91	470.15	477.38	484.61	491.84	499.08
70	506.31	513.54	520.78	528.01	535.24	542.48	549.71	556.94	564.17	571.41
80	578.64	585.87	593.11	600.34	607.57	614.81	622.04	629.27	636.50	643.74
90	650.97	658.20	665.44	672.67	679.91	687.14	694.37	701.60	708.83	716.07
100	723.30	730.53	737.77	745.00	752.23	759.47	766.70	773.93	781.16	788.40

CONVERSION TABLES - Continued

TM: 1006310

0130-4

HDT Expeditionary Systems, Inc.

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Table 6. Newton-Meters to Foot Pounds.

n-m	ft. lb.	n-m	ft. lb.	n-m	ft. lb.	n-m	ft. lb.	n-m	ft. lb.
1.356	1	35.256	26	69.156	51	103.056	76	142.38	105
2.712	2	36.612	27	70.512	52	104.412	77	149.16	110
4.068	3	37.968	28	71.868	53	105.768	78	155.94	115
5.424	4	39.324	29	73.224	54	107.124	79	162.72	120
6.78	5	40.68	30	74.58	55	108.48	80	169.5	125
8.136	6	42.036	31	75.936	56	109.836	81	176.28	130
9.492	7	43.392	32	77.292	57	111.192	82	183.06	135
10.848	8	44.748	33	78.648	58	112.548	83	189.84	140
12.204	9	46.104	34	80.004	59	113.904	84	196.62	145
13.56	10	47.46	35	81.36	60	115.26	85	203.4	150
14.916	11	48.816	36	82.716	61	116.616	86	210.18	155
16.272	12	50.172	37	84.072	62	117.972	87	216.96	160
17.628	13	51.528	38	85.428	63	119.328	88	223.74	165
18.984	14	52.884	39	86.784	64	120.684	89	230.52	170
20.34	15	54.24	40	88.14	65	122.04	90	237.3	175
21.696	16	55.596	41	89.496	66	123.396	91	244.08	180
23.052	17	56.952	42	90.852	67	124.752	92	250.86	188
24.408	18	58.308	43	92.208	68	126.108	93	257.64	190
25.764	19	59.664	44	93.564	69	130.176	96	264.42	195
27.12	20	61.02	45	94.92	70	128.82	95	271.2	200
28.476	21	62.376	46	96.276	71	130.176	96	305.1	225
29.832	22	63.732	47	97.632	72	131.532	97	339	250
31.188	23	65.088	48	98.988	73	132.888	98	372.9	275
32.544	24	66.444	49	100.344	74	134.244	99	406.8	300
33.9	25	67.8	50	101.7	75	135.6	100	678	500

END OF WORK PACKAGE

SUPPORTING INFORMATION
HP-2C/185 UST Trailer
MAC INTRODUCTION

MAINTENANCE ALLOCATION CHART (MAC)

INTRODUCTION

The Army Maintenance System MAC

This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

The MAC (immediately following the introduction) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

Field – includes three sub columns, Crew maintenance (C), Service maintenance (O), and Field maintenance (F).

Sustainment – includes two sub columns, Below Depot (H) and Depot (D).

The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

Maintenance Functions

Maintenance functions are limited to and defined as follows:

1. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel). This includes scheduled inspection and gauging and evaluation of cannon tubes.
2. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e. load testing of lift devices and hydrostatic testing of pressure hoses.
3. Service. Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases. This includes scheduled exercising and purging of recoil mechanisms. The following are examples of service functions:
 - a. Unpack. To remove from packing box for service or when required for the performance of maintenance operations.
 - b. Repack. To return item to packing box after service and other maintenance operations.
 - c. Clean. To rid the item of contamination.
 - d. Touch up. To spot paint scratched or blistered surfaces.
 - e. Mark. To restore obliterated identification.

Maintenance Functions – Continued

4. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.
6. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurements. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
7. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
8. Paint (ammunition only). To prepare and spray color coats of paint so that the ammunition can be identified and protected. The color indicating primary use is applied, preferably, to the entire exterior surface as the background color of the item. Other markings are to be repainted as original so as to retain proper ammunition identification.
9. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.
10. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

NOTE

The following definitions are applicable to the "repair" maintenance function:

Services. Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting. The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (UUT).

Disassembly/assembly. The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

Actions. Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

11. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

12. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

Explanation of Columns in the MAC

Column (1) Group Number. Column (1) lists Functional Group Code (FGC) numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

Column (2) Component/Assembly. Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

Column (3) Maintenance Function. Column (3) lists the functions to be performed on the item listed in column (2). (For a detailed explanation of these functions refer to "Maintenance Functions" outlined above).

Column (4) Maintenance Level. Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as man-hours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

Field:

- C Operator or Crew maintenance
- O Service maintenance
- F Field maintenance

Sustainment:

- L Specialized Repair Activity
- H Below Depot maintenance
- D Depot maintenance

NOTE

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" column of column (4), and an associated reference code is used in the REMARKS column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

Column (5) Tools and Equipment Reference Code. Column (5) specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

Column (6) Remarks Code. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

Explanation of Columns in Tools and Test Equipment Requirements

Column (1) Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in column (5) of the MAC.

Column (2) Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

Explanation of Columns in Tools and Test Equipment Requirements – Continued

Column (3) Nomenclature. Name or identification of the tool or test equipment.

Column (4) National Stock Number (NSN). The NSN of the tool or test equipment.

Column (5) Tool Number. The manufacturer's part number, model number, or type number.

Explanation of Columns in the Remarks

Column (1) Remarks Code. The code recorded in column (6) of the MAC.

Column (2) Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

END OF WORK PACKAGE

SUPPORTING INFORMATION
HP-2C/185 UST Trailer
MAINTENANCE ALLOCATION CHART (MAC)

Table 1. MAC for HP-2C/185 UST Trailer.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND TEST EQUIPMENT REF CODE	(6) REMARKS CODE	
			FIELD			SUSTAINMENT				
			CREW	SERVICE	FIELD	BELOW DEPOT	DEPOT			
			C	O	F	H	D			
01	HP-2C/185 UST Trailer GREEN TAN	INSPECT	0.10						A, B	
		REPAIR		1.00				1	C	
		REPAIR			3.00				J	
		REPAIR					*		X	
0101	AIR CONDITIONER	INSPECT	0.20						D, E	
		TEST	0.20						H	
		SERVICE	0.20						G	
		SERVICE		0.30				1	A, F, G	
		REPLACE		1.00				1		
		REPAIR		0.10				1	J	
		SERVICE			1.00			1,3,7,9,10	Y	
		REPAIR			1.00			1,3,6-12	J	
		REPAIR					*		X	
010101		AIR CONDITIONER ENCLOSURE	INSPECT	0.10					A	
			REPLACE		0.30				1	
			REPAIR		1.00				1	J
	TEST				1.00			2	Z	
		REPAIR			1.00			1, 3,6-12	J	
0101010 1		PANEL, EVAPORATOR ASSEMBLY	INSPECT	0.10					A	
			REPLACE		0.20				1	
			REPAIR		0.30				1	J
0101010 2	CONTROL, ENCLOSURE, AIR CONDITIONER	INSPECT	0.10						A	
		ADJUST	0.10						N	
		REPAIR		0.10				1	J	
		TEST			1.00			2	Z	
		REPAIR			1.00			1	J	
		REPLACE					*		X	
		REPAIR					*		X	

Table 1. MAC for HP-2C/185 UST Trailer – Continued.

(1)	(2)	(3)	(4)					(5)	(6)
			MAINTENANCE LEVEL						
			FIELD			SUSTAINMENT			
GROUP NUMBER	COMPONENT/ ASSEMBLY	MAINTENANCE FUNCTION	CREW	SERVICE	FIELD	BELOW DEPOT	DEPOT	TOOLS AND TEST EQUIPMENT REF CODE	REMARKS CODE
			C	O	F	H	D		
01010103	BLOWER ASSEMBLY	INSPECT	0.10						A
		ADJUST		0.10				1	I
		REPLACE		0.20				1	
		REPAIR		0.30				1	J
		TEST			1.00			2	Z
		REPAIR			1.00			1	J
		REPAIR					*		X
0102	GENERATOR, DIESEL ENGINE	INSPECT	0.10						A,L,M
		SERVICE	0.10						G, K, P
		ADJUST	0.10						V
		REPAIR		0.30				1	J
		TEST			1.00			2	Z
		REPLACE			1.00			1	
		REPAIR			1.00			1, 2, 4	J
		REPAIR					*		X
010201	BATTERY ASSEMBLY	INSPECT	0.10						A
		TEST	0.20						U
		REPLACE		0.70				1	
		REPAIR		0.70				1, 2	J
010202	ENGINE/ GENERATOR ASSEMBLY	TEST		0.20				1, 2	Z
		REPAIR		1.00				1, 2	J
		TEST			0.20			1, 2	Z
		REPLACE			3.00			1, 5	
		REPAIR			1.00			1, 2, 4	J
01020201	COOLING SYSTEM, INSTALLATION	INSPECT	0.10						A
		ADJUST		0.20				1	AA
		REPLACE		1.00				1	
		REPAIR		1.00				1	J

Table 1. MAC for HP-2C/185 UST Trailer – Continued.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANC E FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND TEST EQUIPMENT REF CODE	(6) REMARKS CODE
			FIELD			SUSTAINMENT			
			CREW	SERVICE	FIELD	BELOW DEPOT	DEPOT		
			C	O	F	H	D		
0102020 2	AIR INTAKE ASSEMBLY	INSPECT	0.10						A
		REPAIR		0.10				1	J
		REPAIR					*		X
010203	RADIATOR INSTALLATION	INSPECT	0.10						A
		SERVICE	0.10						G
		REPLACE		1.00				1	
		REPAIR		1.00				1	J
		REPAIR					*		X
010204	EXHAUST ASSEMBLY	INSPECT	0.10						A
		REPLACE		0.70				1	
		REPAIR		1.00				1	J
010205	CONTROL PANEL	INSPECT	0.10						A
		REPAIR		0.10					AB
		TEST			0.10			2	Z
		REPAIR			1.00			1, 2, 4	J
010206	POWER DISTRIBUTION PANEL	INSPECT	0.10						A
		REPAIR		0.10					AB
		TEST			0.10			2	Z
		REPAIR			1.00			1, 2, 4	J
010207	BARRIER PANEL	INSPECT	0.10						A
		REPAIR		0.10				1	W
		TEST			1.00			2	Z
		REPAIR			1.00			1, 2, 4	J
		REPAIR					*		X
0103	CHASSIS, TRAILER ASSEMBLY	INSPECT	0.10						A, Q
		TEST	0.10						R
		ADJUST	0.10						S
		SERVICE	0.20						G
		REPAIR		0.80				1, 2	J, T
		REPAIR			1.00			1	J
		REPAIR					*		X

Table 1. MAC for HP-2C/185 UST Trailer – Continued.

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND TEST EQUIPMENT REF CODE	(6) REMARKS CODE
			FIELD			SUSTAINMENT			
			CREW	SERVICE	FIELD	BELOW DEPOT	DEPOT		
			C	O	F	H	D		
010301	STOP LIGHT, VEHICULAR	INSPECT	0.10						A
		REPLACE		0.30				1	
		REPAIR		0.20					J
010302	TONGUE JACK ASSEMBLY	INSPECT	0.10						A
		REPLACE		0.30				1	
		REPAIR		0.20				1	J
010303	BRAKE INSTALLATION	INSPECT	0.10					1	Q
		REPLACE			3.00			1	
		REPAIR			1.00			1	J
01030301	ACTUATOR ASSEMBLY	INSPECT	0.10						A
		REPLACE			1.00				
		REPAIR			1.00				J

Table 2. Tools and Test Equipment for HP-2C/185 UST Trailer.

TOOL OR TEST EQUIPMENT REF. CODE	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
1	O, F	TOOL KIT, GENERAL MECHANIC'S	5180-01-483- 0249	SC-5180-95-B47
2	O, F	MULTIMETER	6625-01-265- 6000	27 W/ACCE
3	F	TOOL KIT, SERVICE, REFRIGERATION UNIT	5180-00-596- 1474	SC-5180-95-N18
4	F	TOOL KIT, ELECTRONIC, TK-105 A/G	5180-01-460- 9328	5180-91-CL-R64
5	F	STANDARD AUTOMOTIVE TOOL SET	4910-01-490- 6453	4910-95-A81
6	F	NITROGEN PRESSURE REGULATOR	6680-00-503- 1327	
7	F	REFRIGERANT RECOVERY/RECYCLING UNIT	4130-01-338- 2707	
8	F	PUMP, VACUUM	4130-00-289- 5967	
9	F	CHARGING MANIFOLD, R407C TYPE		MASTER COOL PN 96561-G
10	F	CHARGING CYLINDER, RECOVERY TANK	4330-01-387- 1501	
11	F	VALVE CORE REMOVER/INSTALLER		MASTER COOL PN: 91496
12	F	QUICK RELEASE VALVE SET		MASTER COOL PN: 90262

Table 3. Remarks for HP-2C/185 UST Trailer.

REMARKS CODE	REMARKS
A	Visual inspection of assembly and components for damage, lose, or missing hardware.
B	Inspect for proper ground connection.
C	Repair by replacement of power distribution unit (PDU) assembly, 25' PDU cable assembly, lights assembly, and fuel supply/return line.
D	Inspect ECU enclosure drain ports and air return duct filters for obstruction or damage.
E	Inspect condenser and evaporator coils for dirt/dust.
F	Service by cleaning condenser coil, or filters.
G	Preventive Maintenance Checks and Services (PMCS).
H	Test air conditioner assembly heating and cooling function.
I	Adjust evaporator fan belt to proper tension.
J	Repair by replacement of assemblies, subassemblies, and components.
K	Service generator by priming fuel system.
L	Inspect generator engine assembly for coolant leaks and proper oil and coolant levels. Inspect for proper oil pressure and coolant temperature.
M	Check for damaged or frayed cables, loose connections at alternator, starter, and starter solenoid. Check condition of engine fan belt.
N	Adjust ECU control panel by setting ECU thermostat to appropriate temperature setting.
O	Not used.
P	Service generator engine assembly by charging batteries.
Q	Inspect trailer assembly for surge brake fluid level, service brake operation, parking brake operation, and proper tire air pressure.
R	Test trailer brake lights, running lights, turn signals, and hazard lights operation.
S	Adjust parking brakes for proper operation.
T	Refer to TM 9-2330-392-14&P for Wheel and Tire Assembly replacement.
U	Test batteries for proper voltage by observing voltage meter on Genset control panel.
V	Adjust Genset output voltage.
W	Repair by replacement of fuses.
X	Sustainment Maintenance performed by Field Service Representatives or Depot Maintenance Teams.
Y	Service by recovery and recharge of air conditioner coolant.
Z	Test electrical continuity and/or functionality of circuit.
AA	Adjust fan belt to proper tension.
AB	Repair by replacement of indicator bulbs.

END OF WORK PACKAGE

SUPPORTING INFORMATION
HP-2C/185 UST Trailer
COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS

INTRODUCTION

Scope

This work package lists COEI and BII for the HP-2C/185 UST Trailer to help you inventory items for safe and efficient operation of the equipment.

General

The COEI and BII information is divided into the following lists:

Components of End Item (COEI). This list is for information purposes only and is not authority to requisition replacements. These items are part of the HP-2C/185 UST Trailer. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

Basic Issue Items (BII). These essential items are required to place the HP-2C/185 UST Trailer in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the HP-2C/185 UST Trailer during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

Explanation of Columns in the COEI List and BII List

Column (1) Illus Number. Gives you the number of the item illustrated.

Column (2) National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (3) Description, Part Number/(CAGEC). Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (4) Usable on Code. When applicable, gives you a code if the item you need is not the same for different models of equipment.

Code

Used on

Column (5) (U/I). Unit of Issue (UI) indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2).

Column (6) Qty Rqr. Indicates the quantity required.

COMPONENTS OF END ITEM

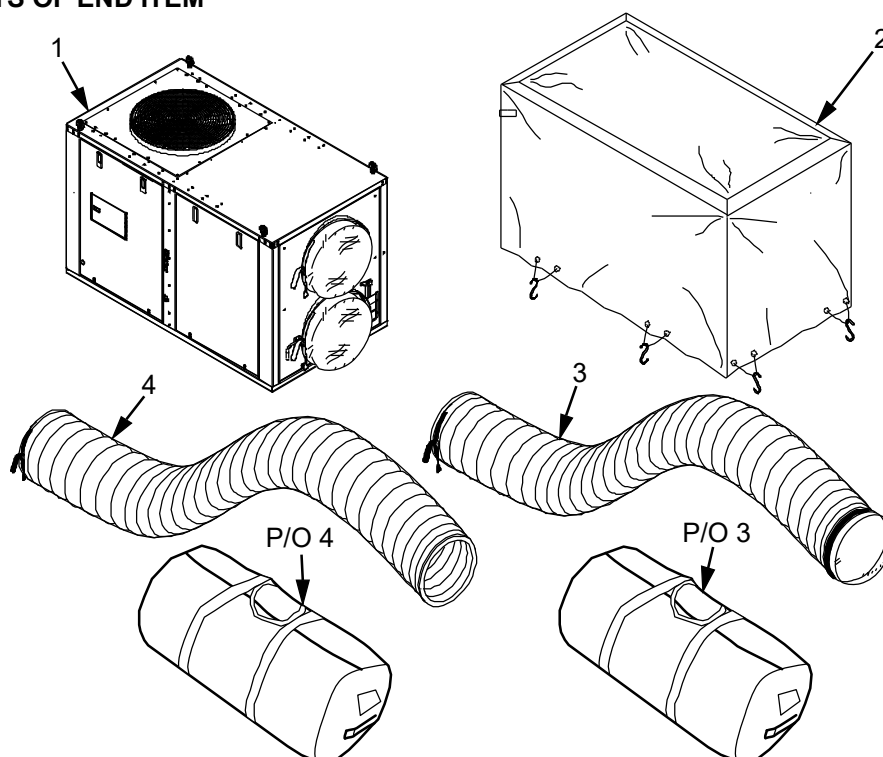


Table 1. Components of End Item List.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
1		AIR CONDITIONER [GREEN] T25050G, (7JYX1)	89W	EA	1
		AIR CONDITIONER [TAN] T25050T, (7JYX1)	89X	EA	1
2	2540-01-558-8455	TARPAULIN [GREEN] SH535-0007G, (7JYX1)	89W	EA	1
	2540-01-558-7518	TARP, TAN SH535-0007T, (7JYX1)	89X	EA	1
3	8105-01-575-2509	BAG, DUCT A602126, (7JYX1)	89W, 89X	EA	2
4	4720-01-553-5827	DUCT, AIR RETURN [GREEN] T291434, (7JYX1)	89W	EA	1
	4720-01-559-2546	DUCT, AIR RETURN [TAN] T291528, (7JYX1)	89X	EA	1
5	4720-01-553-5758	DUCT, AIR SUPPLY [GREEN] T291433, (7JYX1)	89W	EA	1
	4720-01-558-9393	DUCT, AIR SUPPLY [TAN] T291527, (7JYX1)	89X	EA	1

COMPONENTS OF END ITEM – Continued

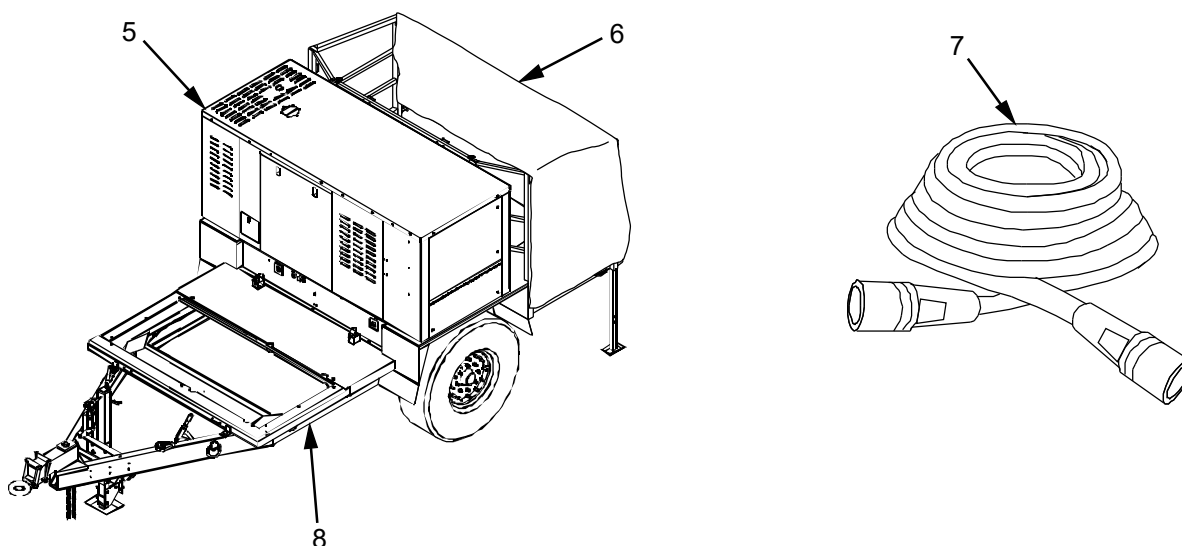


Table 1. Components of End Item List – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
6		GENERATOR, DIESEL ENGINE [GREEN] 1007206, (7JYX1)	89W	EA	1
		GENERATOR, DIESEL ENGINE [TAN] 1007205, (7JYX1)	89X	EA	1
7	8340-01-572-0253	TARPAULIN [GREEN] SH535-0008G (7JYX1)	89W	EA	1
	2540-01-558-8554	TARPAULIN [TAN] SH535-0008T (7JYX1)	89X	EA	1
8	6150-01-552-6358	CABLE ASSEMBLY, POWER, ELECTRICAL T295004, (7JYX1)	89W, 89X	EA	1
9		CHASSIS, TRAILER ASSEMBLY [GREEN] T215125G, (7JYX1)	89W	EA	1
		CHASSIS, TRAILER ASSEMBLY [TAN] T215125T, (7JYX1)	89X	EA	1

COMPONENTS OF END ITEM – Continued

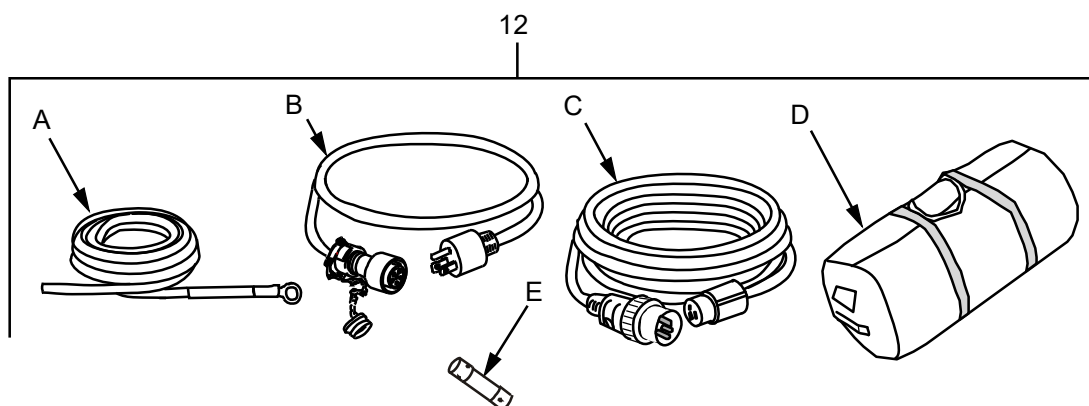


Table 1. Components of End Item List – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
10	8340-01-557-3403	BAG, TENT FRAME PARTS MA100155, (7JYX1)	89W, 89X	EA	1
11	5995-01-552-6935	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL T295101, (7JYX1)	89W, 89X	EA	1
12	5995-01-552-6934	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL T295145, (7JYX1)	89W, 89X	EA	1
13	5995-01-552-8232	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL T295111, (7JYX1)	89W, 89X	EA	1

BASIC ISSUE ITEMS

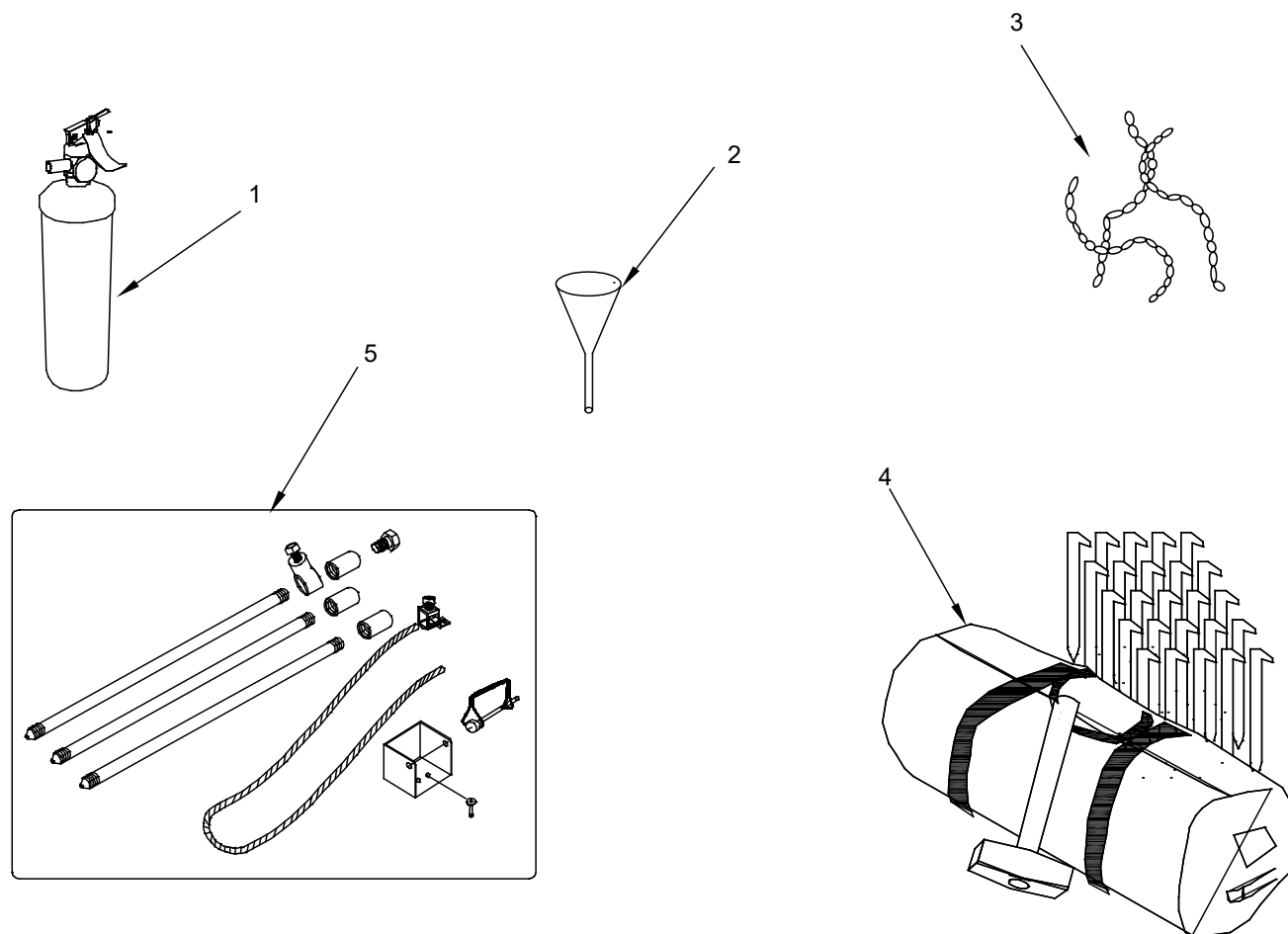


Table 2. Basic Issue Items.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
1	4210-01-552-5109	EXTINGUISHER, FIRE B402T, (49376)	89W, 89X	EA	1
2		FUNNEL T295169, (7JYX1)	89W, 89X	EA	1
3	5340-01-558-9644	ADAPTER, TIE-DOWN A600250, (7JYX1)	89W, 89X	EA	3
5	5975-01-552-6937	GROUND ROD KIT T295146, (7JYX1)	89W, 89X	KT	1

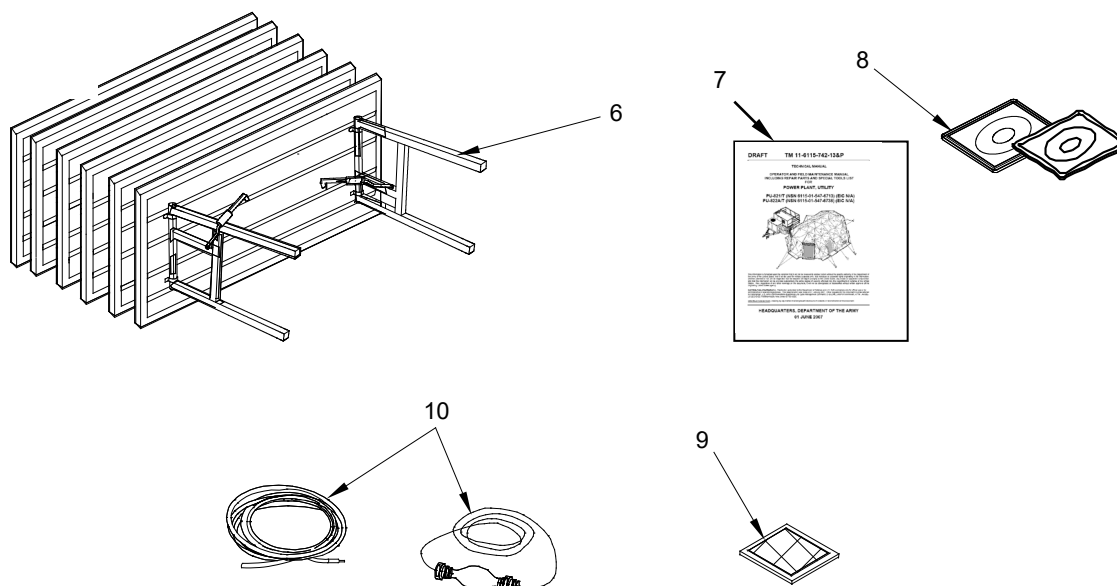


Table 2. Basic Issue Items – Continued.

(1) Illus Number	(2) National Stock Number	(3) Description, Part Number/(CAGEC)	(4) Usable on Code	(5) U/I	(6) Qty Rqr
7	4910-01-301-9125	TECHNICAL MANUAL & RPSTL TM 1006310 (7JYX1)	89W, 89X	EA	1
8		PAN, DRAIN 4204T4, (39428)	89W, 89X	EA	1
9		FUEL LINES, AUXILIARY T295180, (7JYX1)	89W, 89X	SE	1

2	Crate, Wood, STAT System (00-010-401, 7JYX1)	EA	1
2	Kit, Inflation Adapter, 20-Series (00-012-562, 7JYX1)	EA	1

END OF WORK PACKAGE

SUPPORTING INFORMATION
HP-2C/185 UST Trailer
ADDITIONAL AUTHORIZATION LIST (AAL)

INTRODUCTION

Scope

This work package lists additional items you are authorized for the support of the HP-2C/185 UST Trailer.

General

This list identifies items that do not have to accompany the HP-2C/185 UST Trailer and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

Explanation of Columns in the AAL

Column (1) National Stock Number (NSN) - Identifies the stock number of the item to be used for requisitioning purposes.

Column (2) Description, Part Number/(CAGEC) - Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parentheses).

Column (3) Usable on Code - When applicable, gives you a code if the item you need is not the same for different models of equipment.

<u>Code</u>	<u>Used on</u>
-	NA
-	NA

Column (4) Unit of Issue (U/I) - Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

Column (5) Qty Recm - Indicates the quantity recommended.

ADDITIONAL AUTHORIZED LIST ITEMS

Table 1. Additional Authorized List.

(1) National Stock Number (NSN)	(2) Description, Part Number/(CAGEC)	(3) Usable On Code	(4) U/I	(5) Qty Recom

Table 1. Additional Authorization List – Continued.

(1) National Stock Number (NSN)	(2) Description, Part Number/(CAGEC)	(3) Usable On Code	(4) U/I	(5) Qty Recom

END OF WORK PACKAGE

SUPPORTING INFORMATION
HP-2C/185 UST Trailer
EXPENDABLE AND DURABLE ITEMS LIST

INTRODUCTION

Scope

This work package lists expendable and durable items that you will need to operate and maintain the HP-2C/185 UST Trailer. This list is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items), CTA 50-909, Field and Garrison Furnishings and Equipment, or CTA 8-100, Army Medical Department Expendable/Durable Items.

Explanation of Columns in the Expendable/Durable Items List

Column (1) Item Number. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., sealing compound (WP 0165, Item 38)).

Column (2) Level. This column identifies the lowest level of maintenance that requires the listed item (C = Operator/Crew; O = Unit/AMC, F= Direct Support/ASB).

Column (3) National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (4) Item Name, Description, Part Number/(CAGEC). This column provides the other information you need to identify the item. The last line below the description is the part number and the Commercial and Government Entity Code (CAGEC) (in parenthesis).

Column (5) (U/I). Unit of Issue (U/I) code shows the physical measurement or count of the item, such as gallon, dozen, gross, etc.

EXPENDABLE AND DURABLE ITEMS LIST

Table 1. Expendable and Durable Items List.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
1	O	6810-00-075-5546	Alcohol, Isopropyl 7618-19-4 (53390)	BT
2	O	6850-00-664-1403	Anti-Freeze, 1-Gallon (3.78 L) Bottle D3306, (81346)	GL
		6850-00-664-1409	55-Gallon (20.19 L) Drum D3306, (81346)	GL
3	O	8030-00-105-0270	Antiseize Compound NSBT-16N, (5W425)	LB
4	O	6515-01-234-6838	Applicator, Disposable 362 (5L934)	PG

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 1. Expendable and Durable Items List – Continued.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
5	O		Blade, hack saw 4202A18, (39428)	PG
6	C	9150-01-052-6762	Brake Fluid, Automotive (63477)	GL
7	F	3439-00-188-6982	Brazing alloy, (Copper) 3132, (70334)	CO
8	F	3439-00-528-3882	Brazing, alloy, (Silver) QQ-B-654, (81348)	TO
9	O	7920-00-514-2417	Brush, Acid, Swabbing 803-12 (7S147)	GR
10	C		Brush ^{1, 2} SH903-9000, (7JYX1)	EA
11	O	6850-01-474-2302	Cleaning Compound, Solvent, MIL-PRF-680 (81349)	GL
12	O	5350-00-192-5047	Cloth, Abrasive (80 grit) 051144-02460 (76381)	PG
13	O	5350-00-174-1000	Cloth, Abrasive (Waterproof) A-A-1200, (58536)	BD
14	C	7920-00-044-9281	Cloth, Cleaning MIRACLEWIPEL001, (51200)	BX
15	F	3439-01-324-8208	Desoldering Wick 80-2-5 (21267)	EA
16	O	7930-00-056-8144	Detergent, General Purpose Formula409-2202 (93098)	BX
17	C		Duct Tape, Green, ^{1, 2} 2 inch x 12 yards (50.8 mm x 10.97 m) A601350, (7JYX1)	RO
18	C		Duct Tape, Tan, 2 inch x 12 yards ^{1, 2} 2 inch x 12 yards (50.8 mm x 10.97 m) A601360, (7JYX1)	RO
19	C		Fabric, Self-Adhesive, Green ^{1, 2} C424017, (7JYX1)	EA
20	C		Fabric, Self-Adhesive, Tan ^{1, 2} C424018, (7JYX1)	EA

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 1. Expendable and Durable Items List – Continued.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
21	C		Fabric, Self-Adhesive, White ^{1,2} C424019, (7JYX1)	EA
22	F	3439-00-914-8390	Flux, brazing, (use w/ aluminum, brass, copper and steel), O-F-499, (81348)	JR
23	F	3439-00-009-8808	Flux, Soldering (electronic) FLUX R 1QT (81349)	QT
24	C	8415-01-463-5928	Gloves, Rubber , Multipurpose 8415-01-463-5928, (80244)	DZ
25	O	9150-01-305-6879	Grease, Automotive & Artillery, 14 oz Cartridge MIL-G-10924C, (81349)	EA
26	O	4720-01-221-8870	Hose, Nonmetallic 5/8 inch (15.875 mm) ID 28417, (24161)	RO
27	O		Hose, Nonmetallic 3/4 inch (19.05 mm) ID 65009, (04NP0)	RO
28	O		Hose, Nonmetallic 3/8 inch (9.5252 mm) ID 65213, (04NP0)	RO
29	O		Hose, Nonmetallic 5/16 inch (7.94 mm) Dia 535-278, (04NP0)	RO
30	O		Hose, Non-metallic, 50-feet (15.24 m) 7454T16, (39428)	EA
31	F	5970-01-326-1660	Insulation Kit, Sleeving, Thermal FIT-105-MS-1 (92194)	EA
32	F		Insulation Sleeving, Thermal (2 inch W x 30 feet L x 1/8 inch Thk) (50.8 mm W x 9.14 m L x 3.175 mm Thk) 014T101 (3C0M7)	RO
33	F		Insulation Sleeving, Thermal, 5/8 inch ID x 1/2 inch wall (15.875 mm ID x 12.7 mm wall) 014T110 (3C0M7)	RO
34	F		Insulation Sleeving, Thermal, 1-3/8 inch ID x 1/2 inch wall 014T111 (3C0M7)	RO

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 1. Expendable and Durable Items List – Continued.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
35	C	9150-01-152-4117	Lubricating Oil, Engine, 1-Quart (0.947 L) M2104-1-15W40, (81349)	QT
36	C	9150-00-402-4478	Lubricating Oil, Engine, 1-Quart (0.947 L) EMERY3908D, (33358)	QT
37	O	9150-01-035-5392	Lubricating Oil Gear, GO 80W-90, 1-Quart (0.947 L) M2105-1-80W90, (81349)	CN
38	O	9150-01-035-5393	Lubricating Oil, Gear, GO 80W-90, 5-Gallon (18.90 L) MIL-L-2105-3-80W90, (81349)	CN
39	O	9150-01-035-5394	Lubricating Oil, Gear, GO 80W-90, 55-Gallon (208.19 L) Drum M2105-4-80W90, (81349)	DR
40	F	6830-00-292-0732	Nitrogen, Technical Pumped (89783)	CY
41	F	5350-00-598-5537	Paper, Abrasive, Garnet P-P-105 (81348)	HD
42	F	5350-00-186-8819	Paper, Abrasive, (220 grit) P-P-121 (81348)	PG
43	F	5975-01-481-4497	Protector, Electrical Cable 1/2 inch (12.7 mm) black 863-000669, (4X630)	RO
44	F	5975-01-481-4499	Protector, Electrical Cable 1/4 inch (6.35 mm) black 863-000670, (4X630)	RO
45	F		Protector, Electrical Cable 5/8 inch (15.875 mm) black CLT62N-C630, (06383)	RO
46	C	7920-01-447-3002	Rags, Wiping, Absorbent 41200, (0W517)	
47	F		Refrigerant, (R-407c)	

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 1. Expendable and Durable Items List – Continued.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
48	F	5320-00-865-8994	Rivet, Blind M24243/1-D404 (81349)	BX
49	O	8030-00-689-5646	Sealing compound 80065, (1PBQ8)	CN
50	O	8030-00-081-2337	Sealing Compound (087-21) (05972)	BX
51	O	8040-01-331-7131	Silicone Sealant, RTV MIL-A-46106 (81349)	CA
52	C		Sleeve, Repair ^{1, 2} , A601750, (7JYX1)	EA
53	F	3439-00-204-2546	Solder, Tin Alloy SN95/5 SB5WS 0.094 1LB (81346)	SL
54	C	6530-01-268-5480	Spray Bottle 83, (4M682)	EA
55	O	5975-00-727-5153	Strap Tie-Down, Electrical Components, 3 3/4 inch (92.25 mm), MS33671-4-9, (81343)	HD
56	O	5975-00-570-9598	Strap Tie-Down, Electrical Components, 11 1/2 inch (292.10 mm) MS3367-7-9, (81343)	HD
57	O	5975-00-156-3253	Strap Tie-Down, Electrical Components, 14 1/2 inch (368.30 mm), MS3367-2-9, (81343)	HD
58	O	8030-00-889-3535	Tape, Antisiezing AA58092-2-2, (58536)	EA
59	F		Wire, (18 AWG), Stranded 6808K21, (39428)	KT
60	F		Wire, (16 AWG), Stranded, Black 69835K361, (39428)	KT
			Wire, (16 AWG), Stranded, White 69835k461, (39428)	KT

EXPENDABLE AND DURABLE ITEMS LIST – Continued

Table 2. Shelter Repair Kit Items.

(1) Item Number	(2) Level	(3) National Stock Number	(4) Item Name, Description, Part Number/(CAGEC)	(5) U/I
1	C		Hack Saw ^{1, 2} , A601451, (7JYX1)	EA
2	C		Ratchet ^{1, 2} JS900680, (7JYX1)	EA
3	C		Scissors, 4 inch (101.6 mm) ^{1, 2} A601051, (7JYX1)	EA
4	C		Wrench, Spanner 3/16 inch (4.76 mm) ^{1, 2} , A601150, (7JYX1)	EA

NOTE

1. This item is part of Tent Component Kit MA100735 (WP 0166).
2. This item is part of Tent Component Kit MA100740 (WP 0166).

END OF WORK PACKAGE

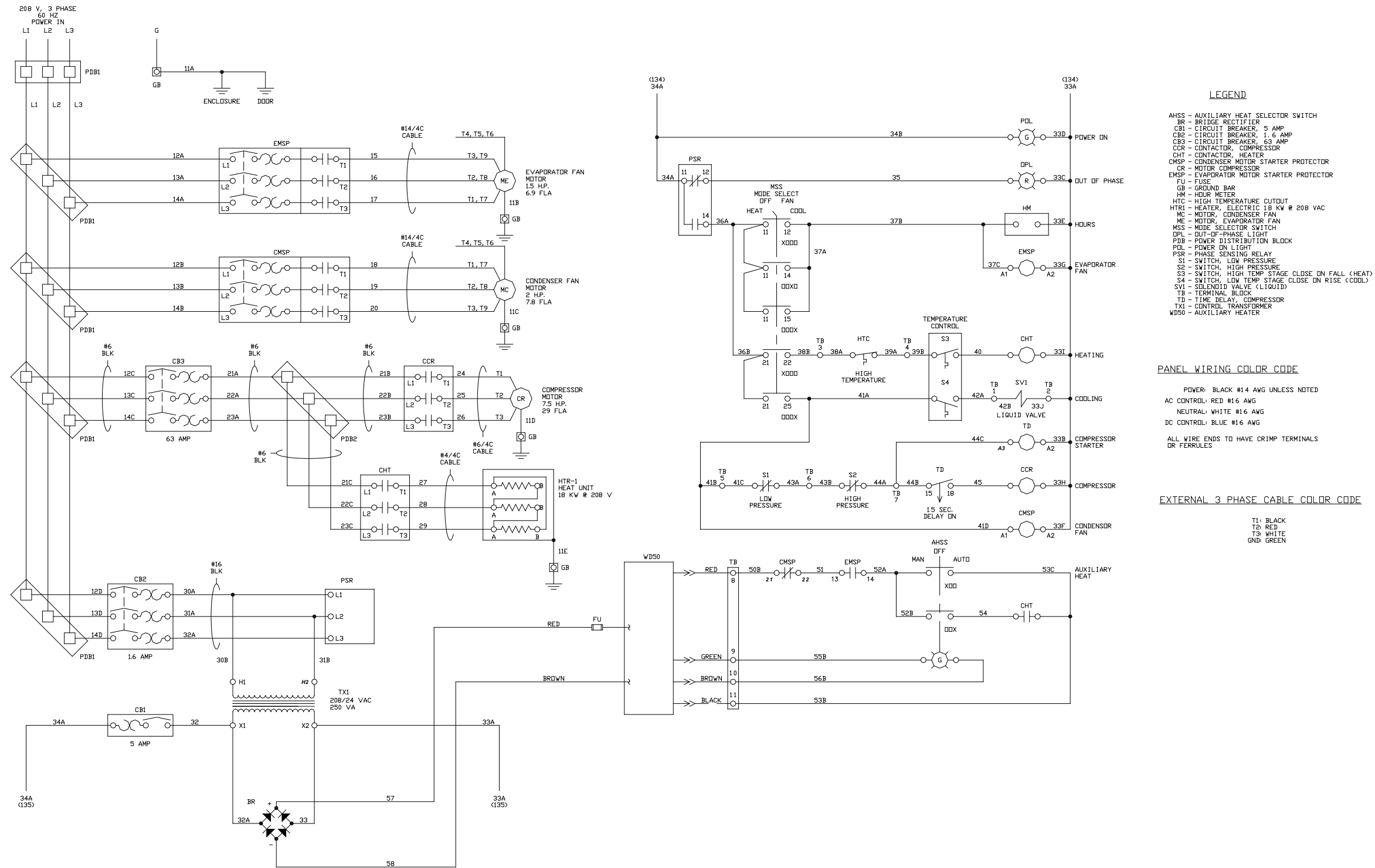


Figure FO-1. Schematic
ECU (V1)

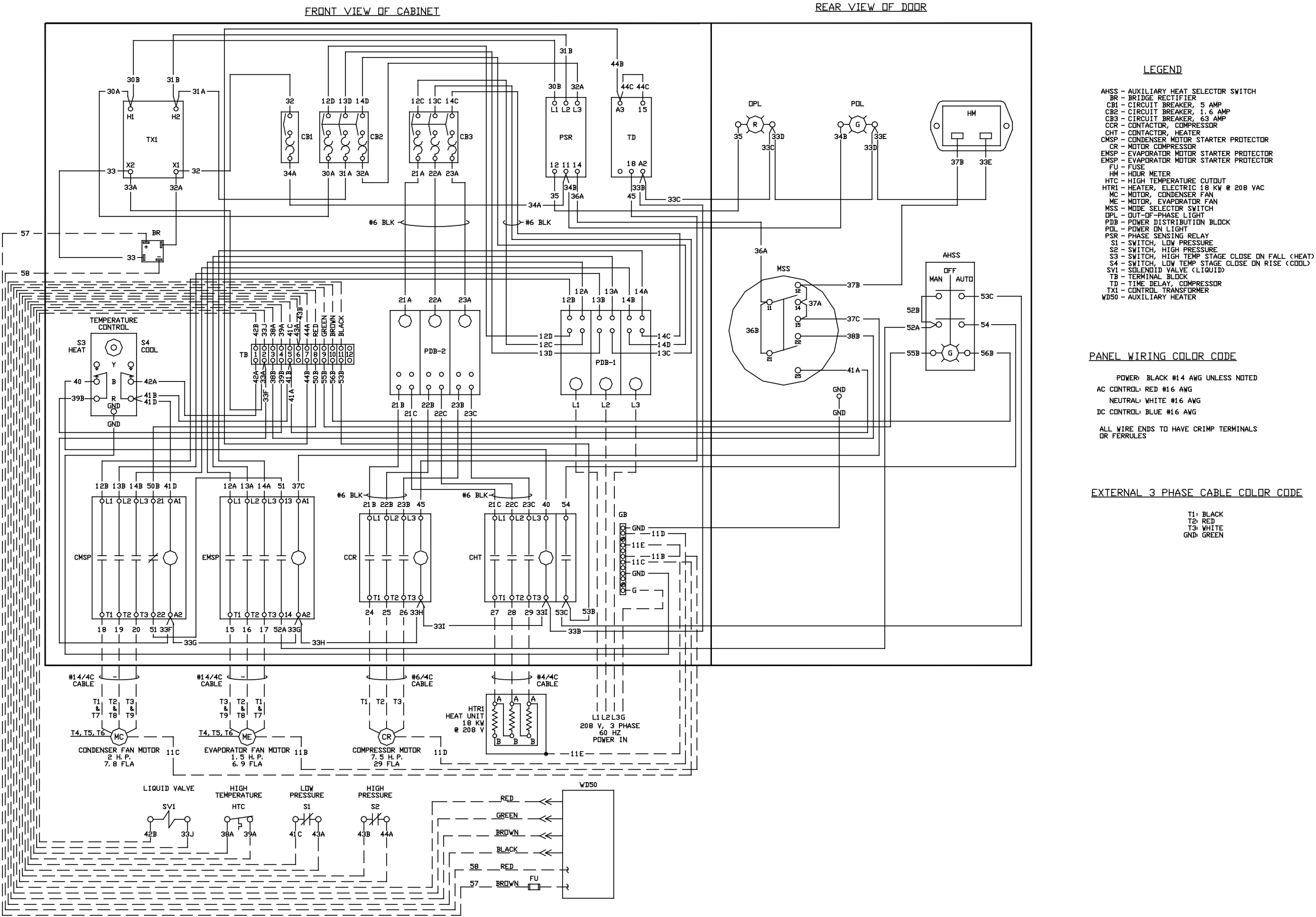


Figure FO-2. Wiring Diagram
ECU (V1)

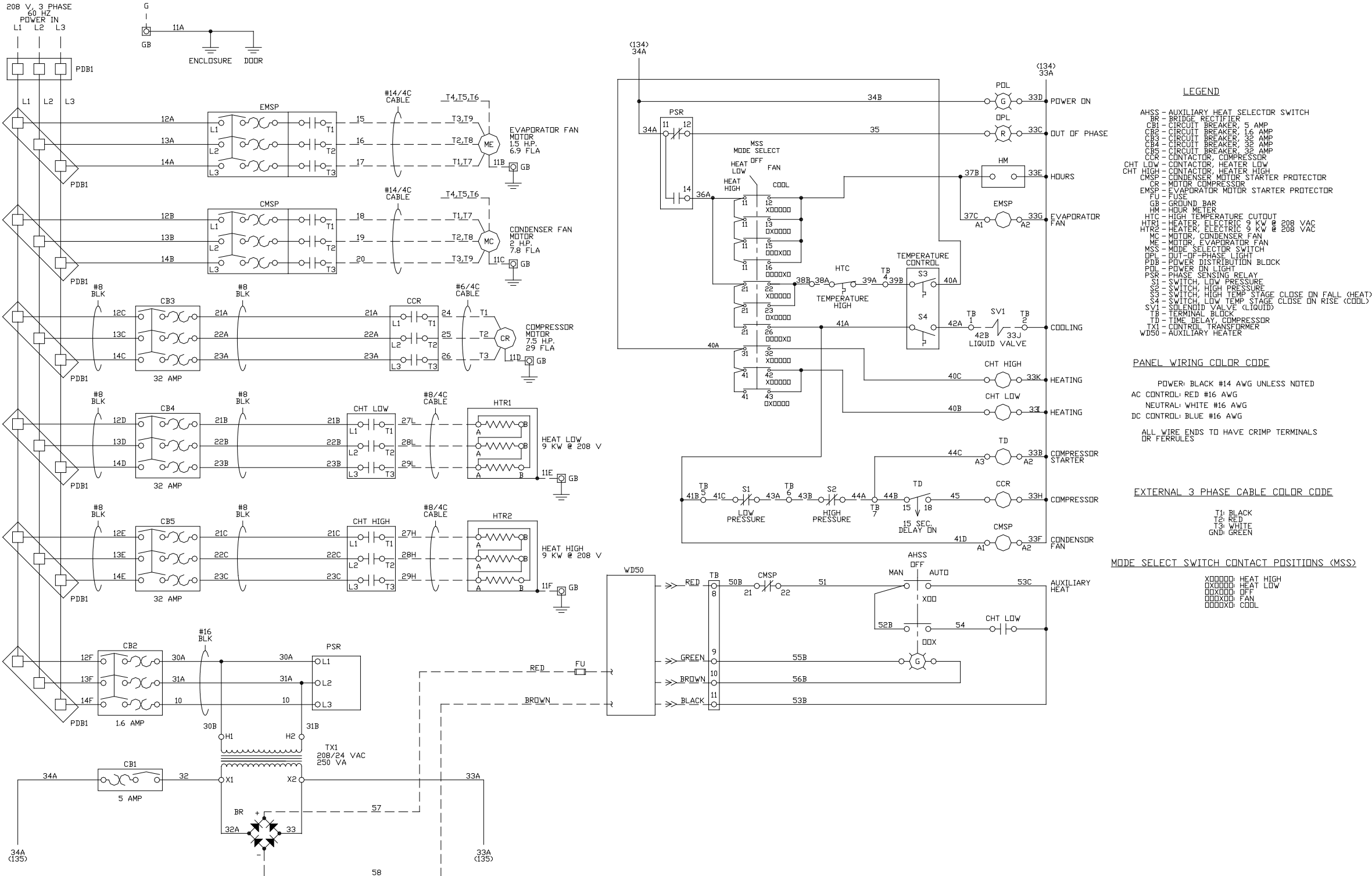


Figure FO-3. Schematic ECU (V2)

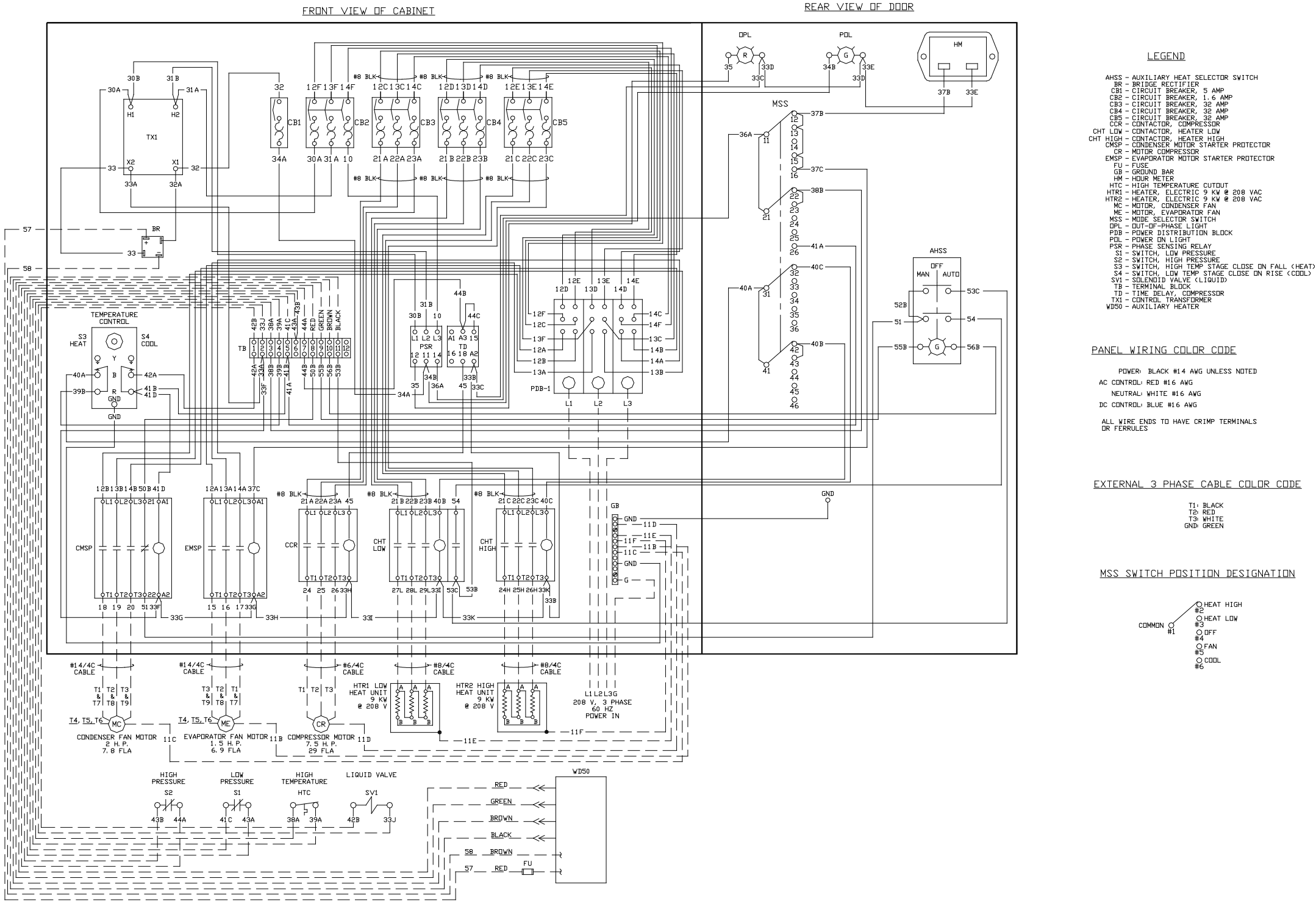


Figure FO-4. Wiring Diagram
ECU (V2)

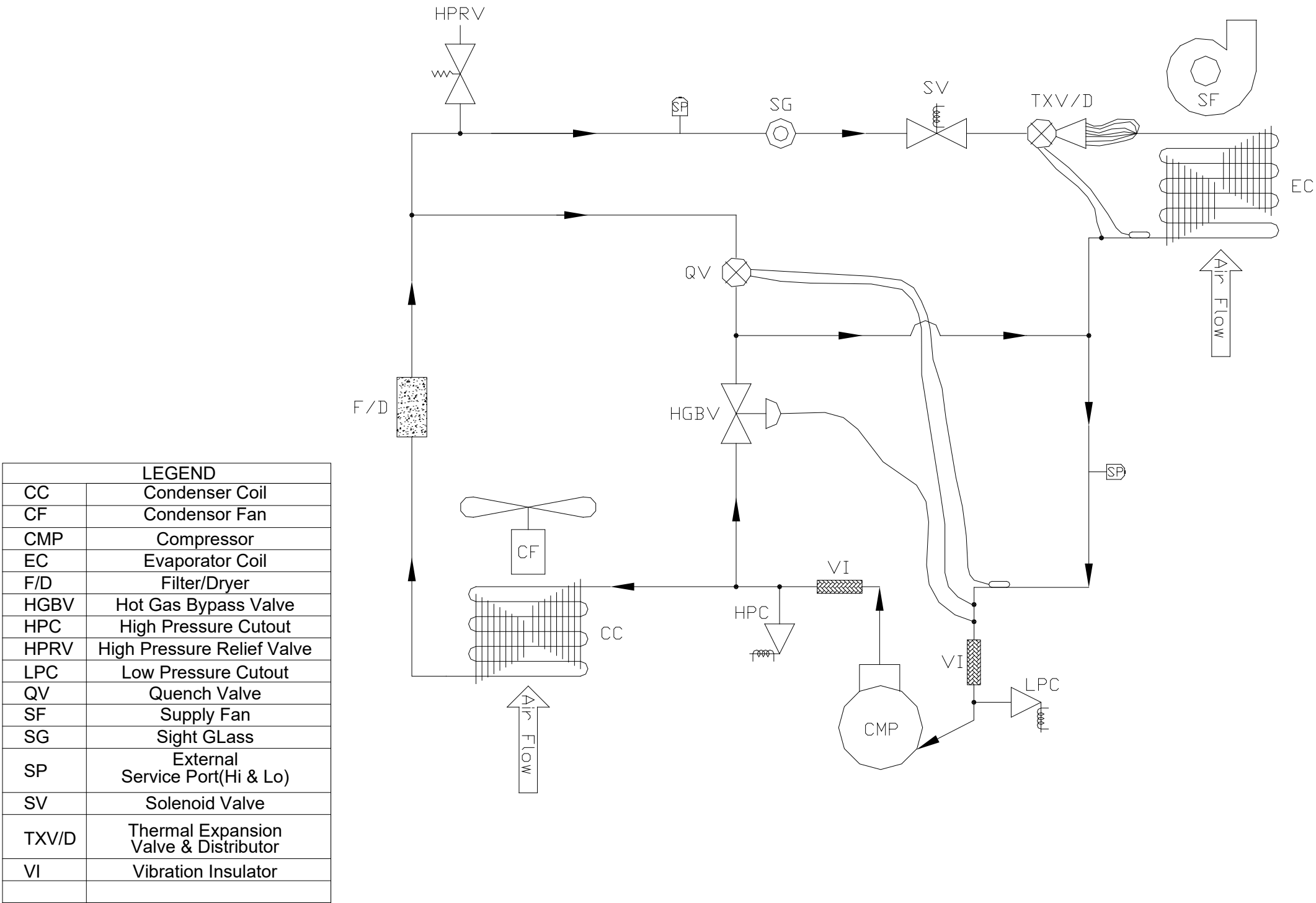
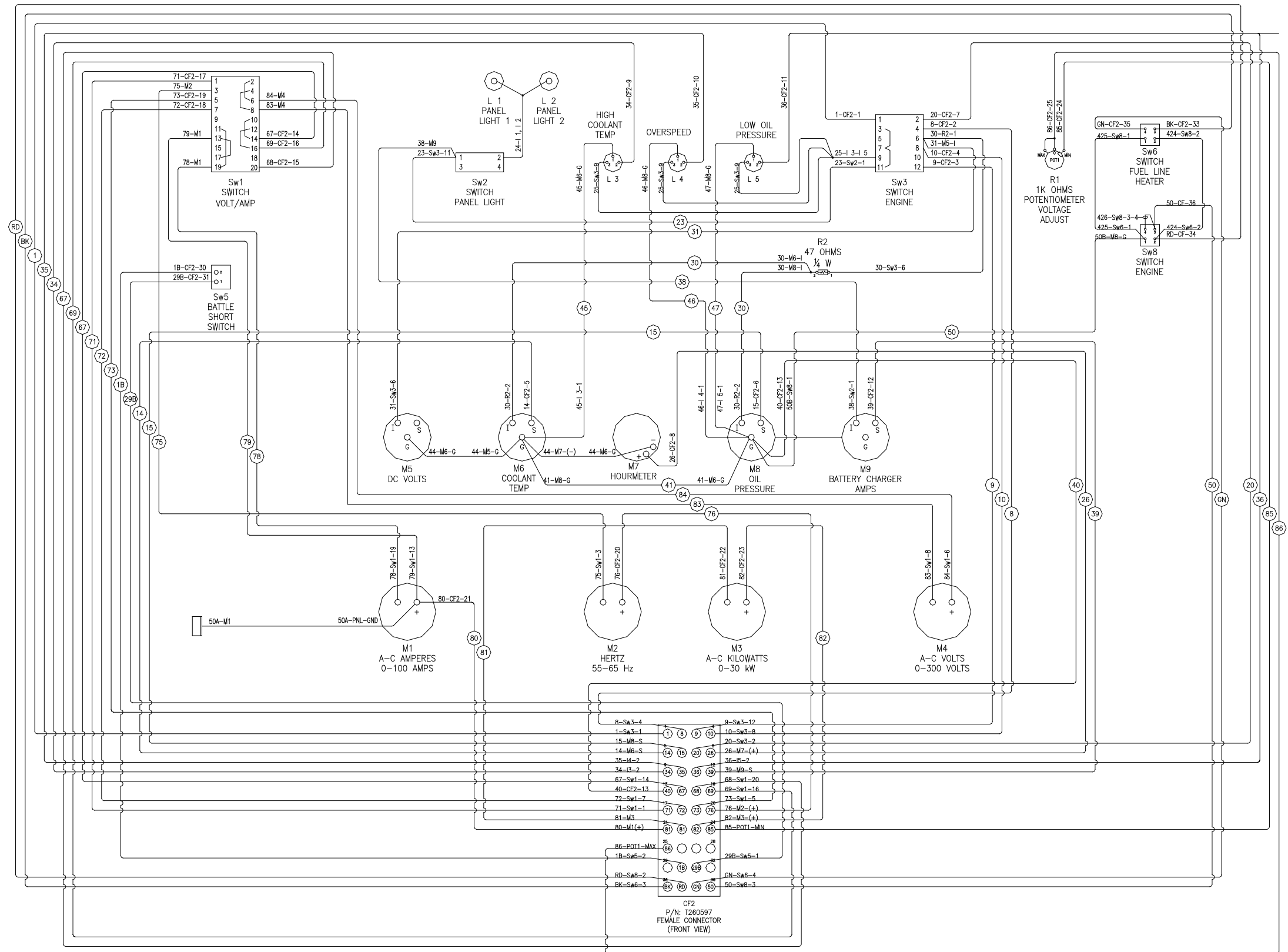


Figure FO-5. Schematic
ECU Refrigerant



**Figure FO-6. Schematic
Genset Control Panel**

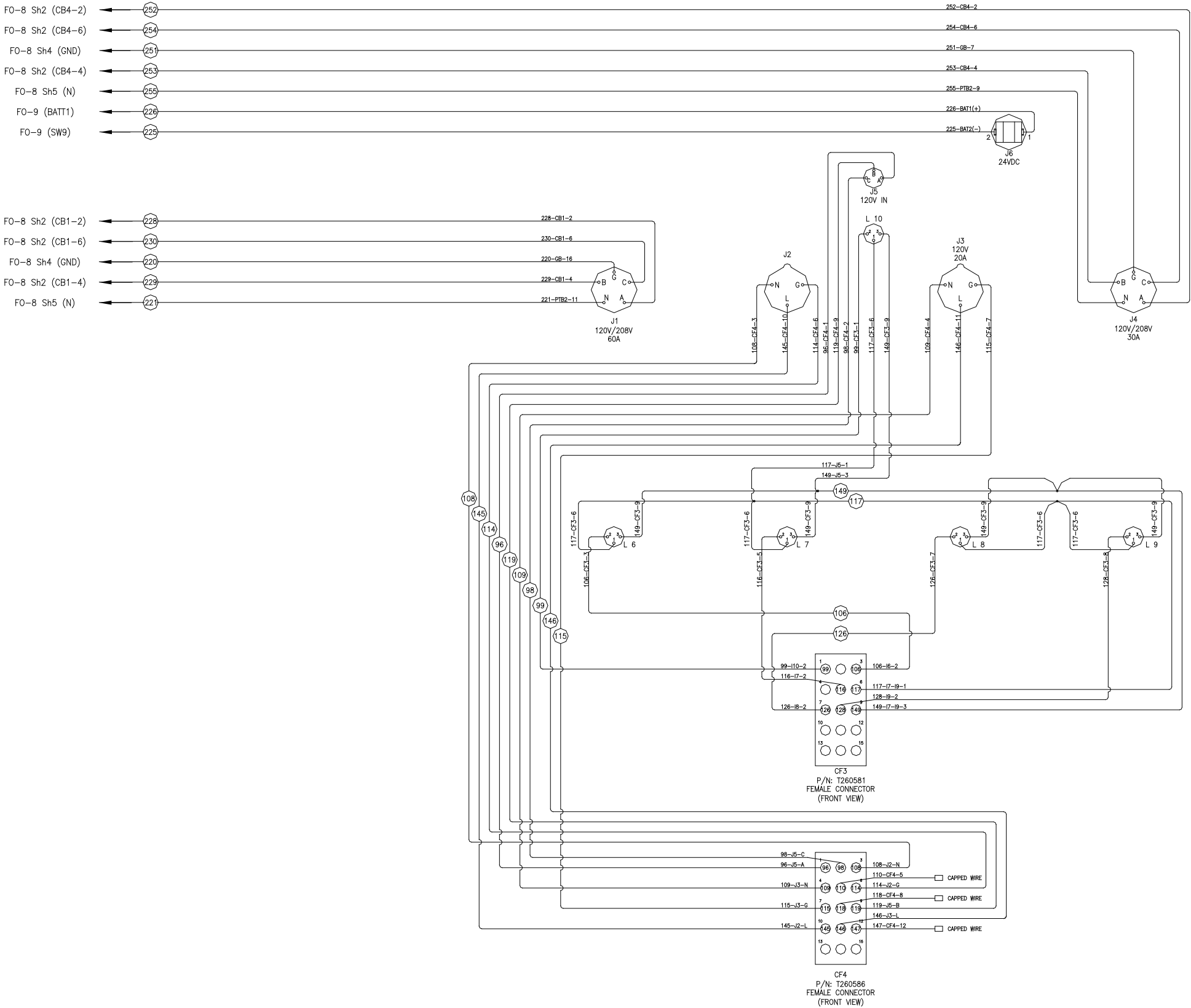


Figure FO-7. Schematic
Genset Power Distribution Panel

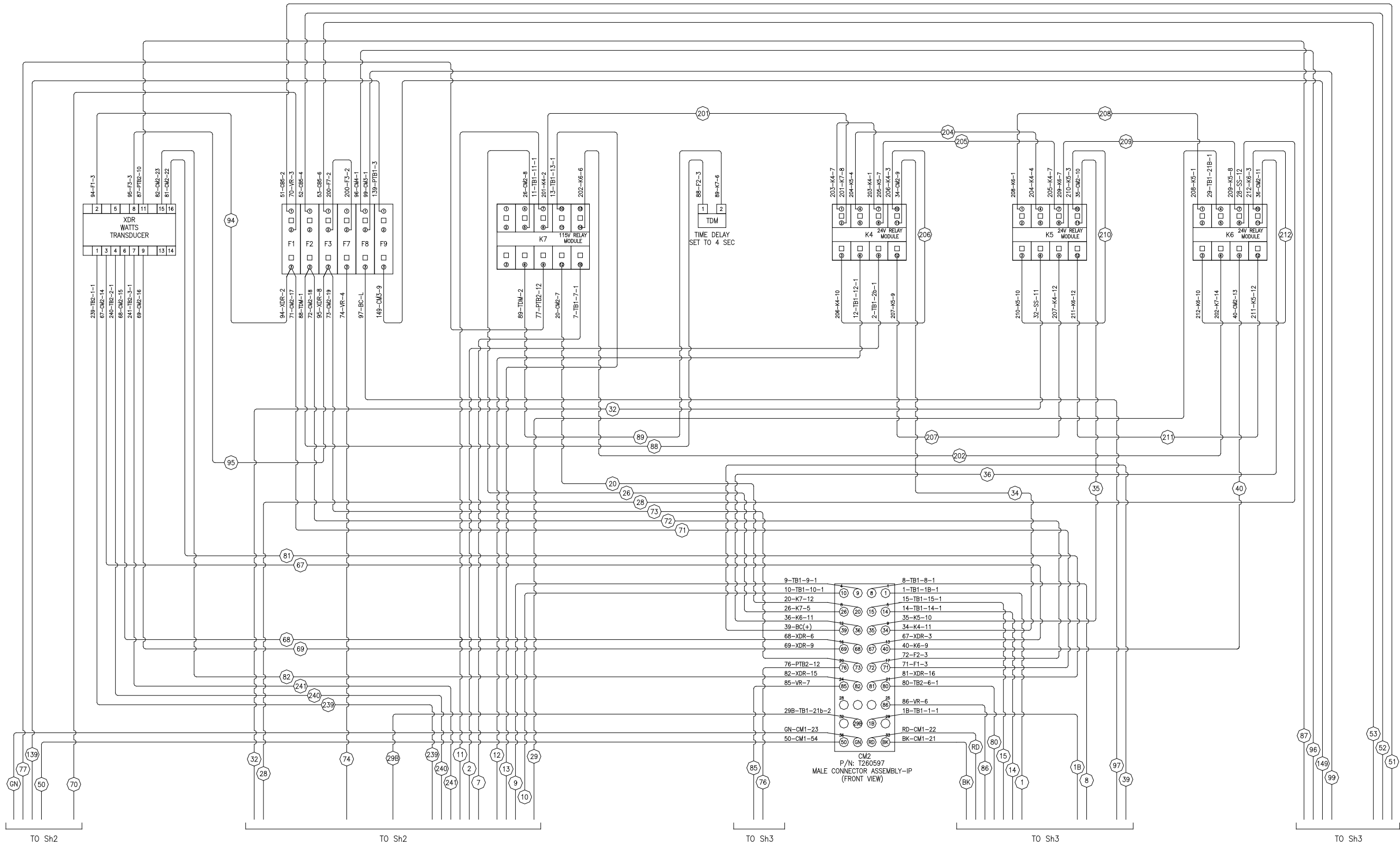


Figure FO-8. Schematic
Genset Barrier Panel
Sheet 1 of 5

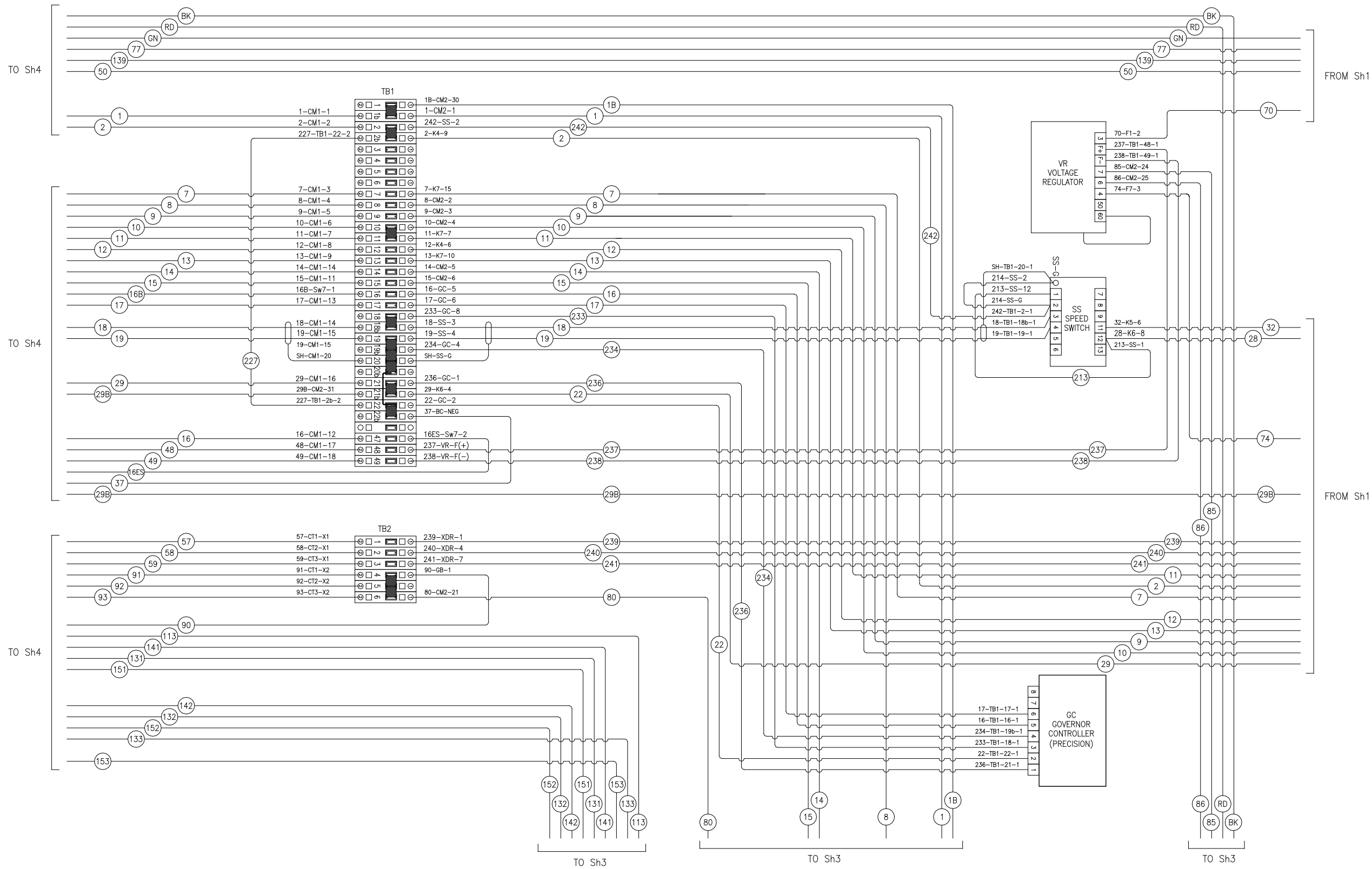


Figure FO-8. Schematic
Genset Barrier Panel
Sheet 2 of 5

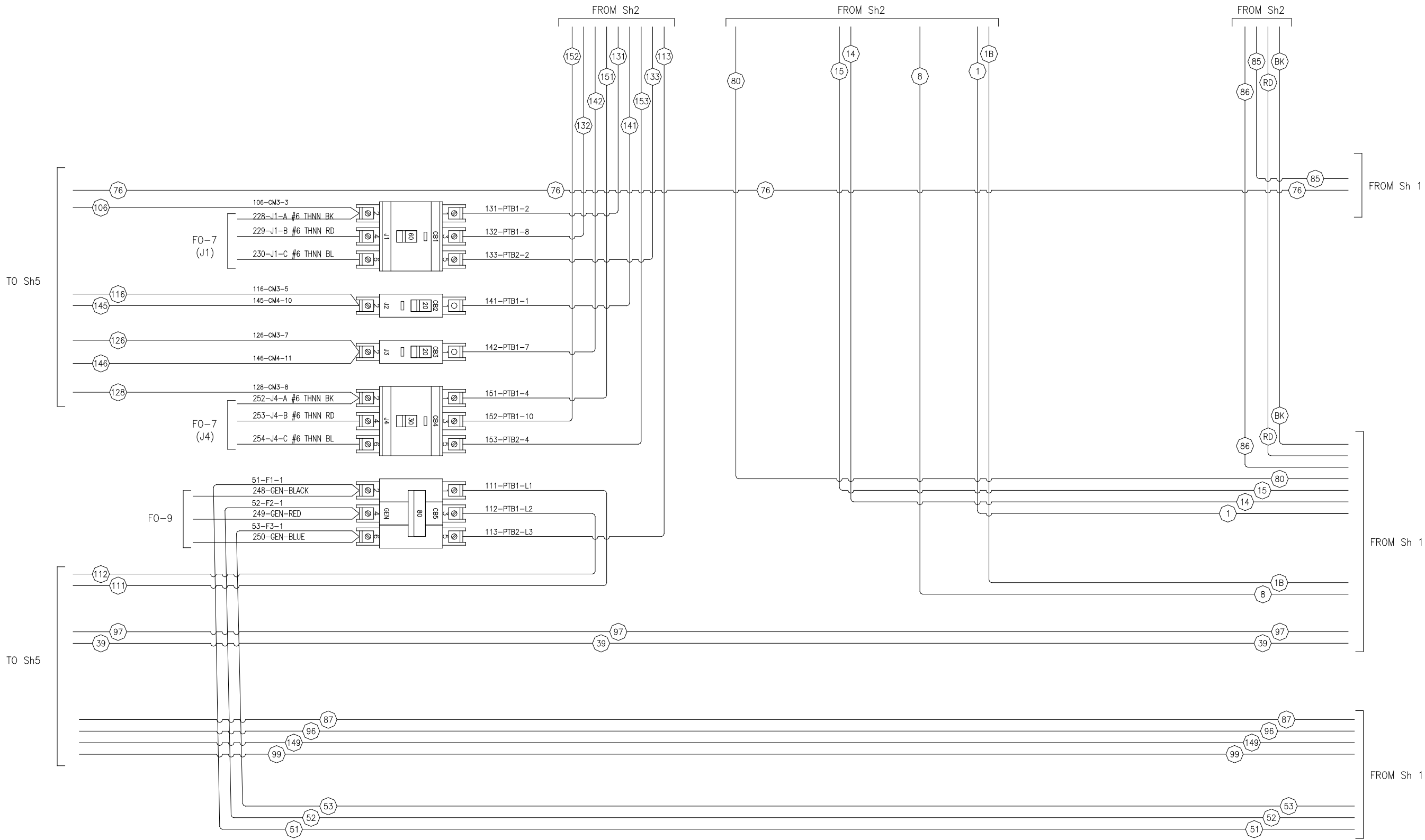


Figure FO-8. Schematic
Genset Barrier Panel
Sheet 3 of 5

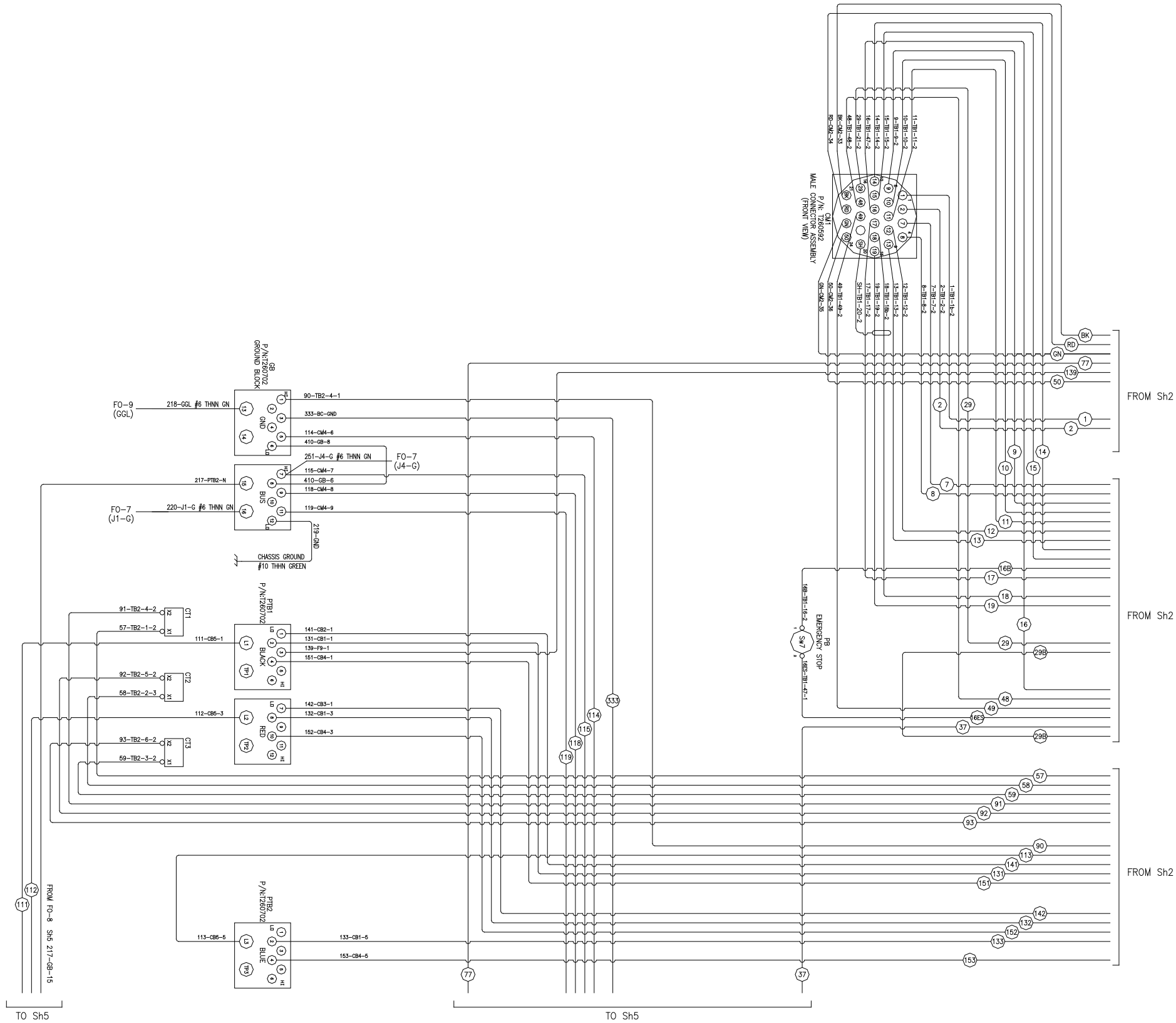


Figure FO-8. Schematic
Genset Barrier Panel
Sheet 4 of 5

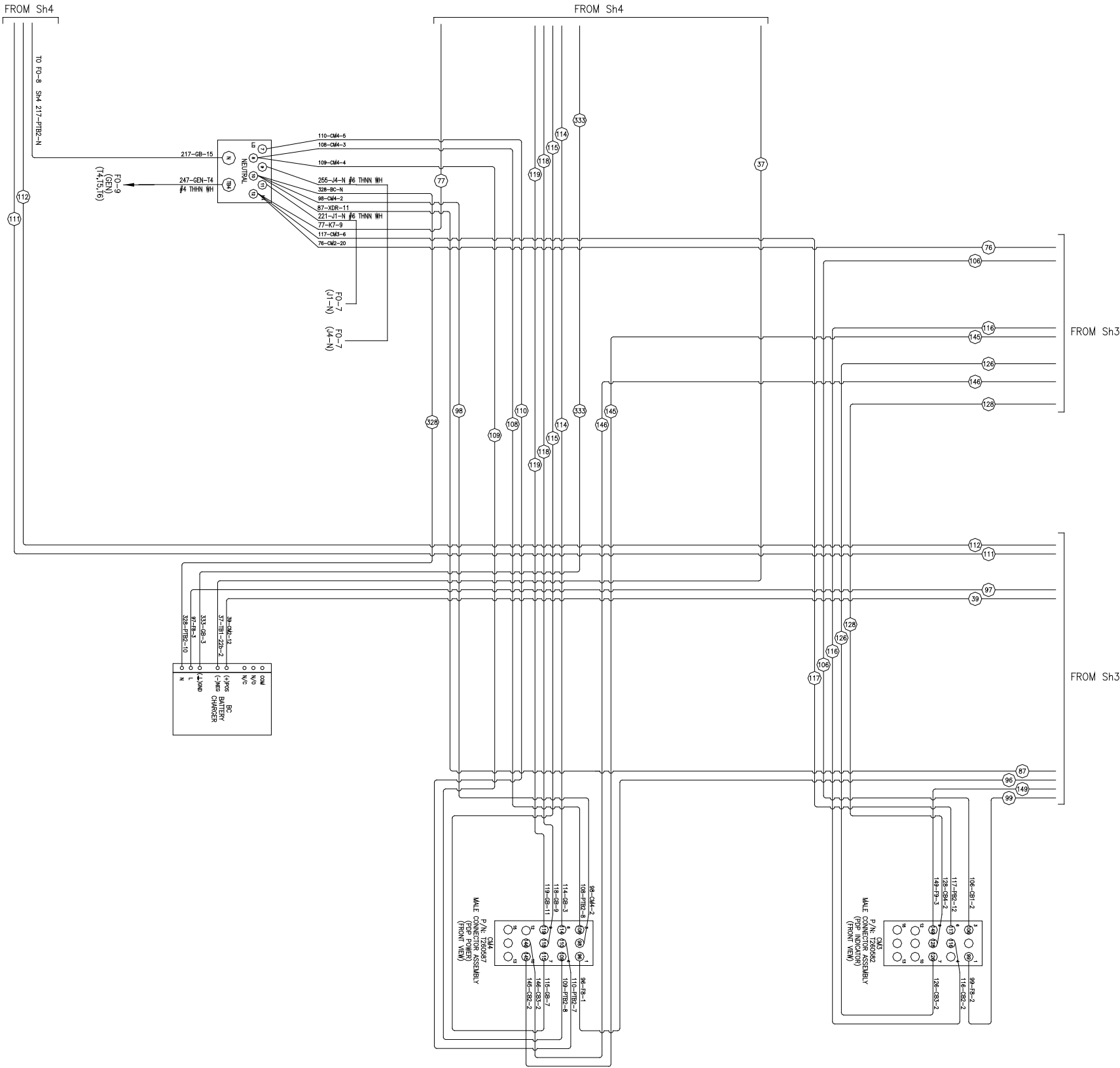


Figure FO-8. Schematic
Genset Barrier Panel
Sheet 5 of 5

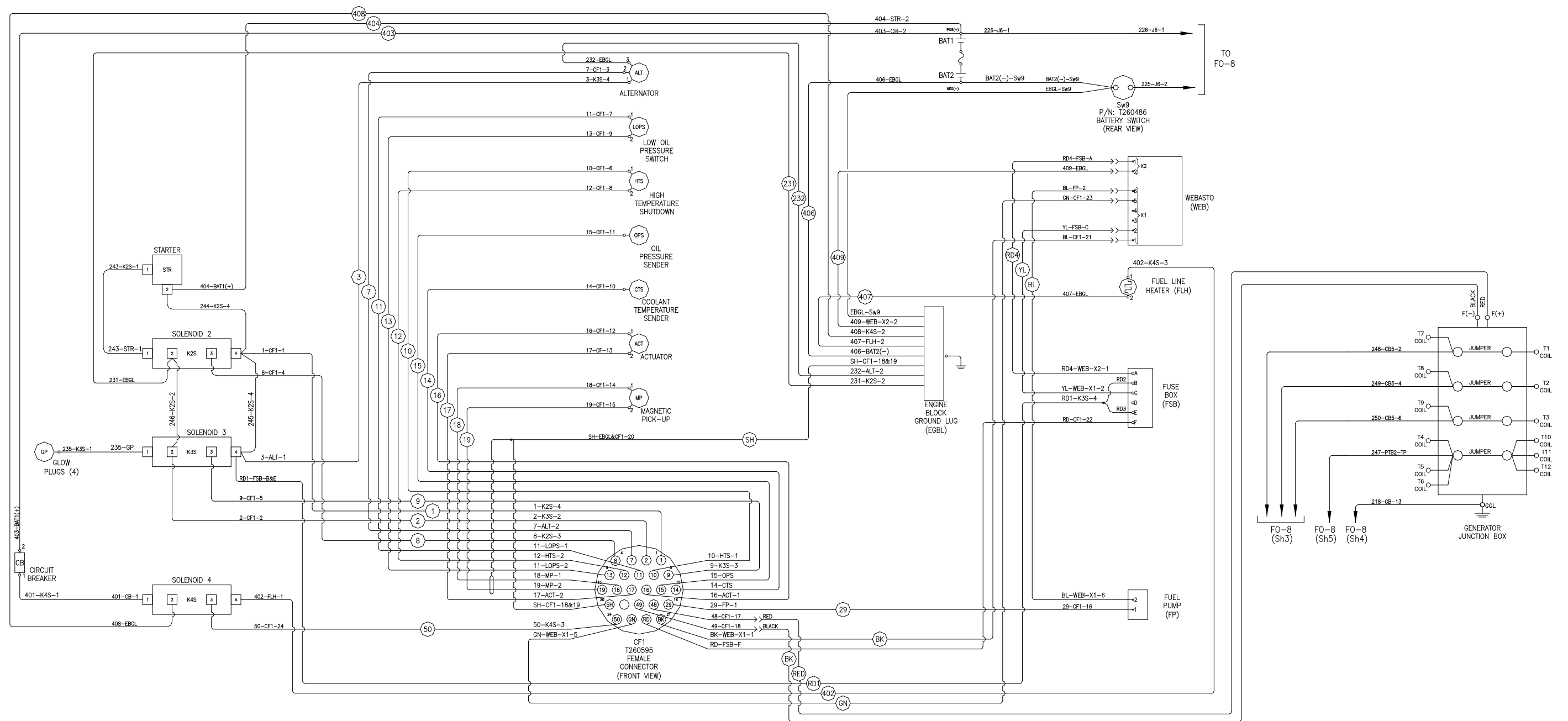


Figure FO-9. Schematic Genset Wiring Harness

#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
1	14	GRAY	K2S-4	CF1-1	CM1-1	TB1-1b-2	TB1-1-1	SW3-1	CM2	-----
1B	16	GRAY	TB1-1-1	CM2-1	CF2-1	SW5-2	-----	-----	-----	-----
2	14	GRAY	K3S-2	CF1-2	CM1-2	TB1-2-2	TB1-2b-1	K4-9	-----	-----
3	14	GRAY	ALT-1	K3S-2	-----	-----	-----	-----	-----	-----
7	16	GRAY	ALT-2	CF1-3	CM1-3	TB1-7-2	TB1-7-1	K7-15	-----	-----
8	16	GRAY	K2S-3	CF1-4	CM1-4	TB1-8-2	TB1-8-1	CM2-2	CF2-2	SW3-4
9	16	GRAY	K3S-3	CF1-5	CM1-5	TB1-9-2	TB1-9-1	CM2-3	CF2-3	SW3-12
10	16	GRAY	HTS-1	CF1-6	CM1-6	TB1-10-2	TB1-10-1	CM2-4	CF2-4	SW3-8
11	16	GRAY	LOPS-1	CF1-7	CM1-7	TB1-11-2	TB1-11-1	K7-7	-----	-----
12	16	GRAY	HTS-2	CF1-8	CM1-8	TB1-12-2	TB1-12-1	K4-6	-----	-----
13	16	GRAY	LOPS-2	CF1-9	CM1-9	TB1-13-2	TB1-13-1	K7-10	-----	-----
14	16	GRAY	CTS	CF1-10	CM1-10	TB1-14-2	TB1-14-1	CM2-5	CF2-5	M6-(S)
15	16	GRAY	OPS	CF1-11	CM1-11	TB1-15-2	TB1-15-1	CM2-6	CF2-6	M8-(S)
16	16	BLACK	ACT-1	CF1-12	CM1-12	TB1-47-2	TB1-16-1	GC-5	-----	-----
16B	16	GRAY	TB1	S7	-----	-----	-----	-----	-----	-----
16ES	16	GRAY	TB1	S7	-----	-----	-----	-----	-----	-----
17	18	WHITE	ACT-2	CF1-13	CM1-13	TB1-17-2	TB1-17-1	GC-6	-----	-----
18	18	RED	MP-1	CF1-14	CM1-14	TB1-18b-2	TB1-18b-1	SS-3	-----	-----
19	18	BLACK	MP-2	CF1-15	CM1-15	TB1-19-2	TB1-19-1	SS-4	-----	-----
SH	18		CM1-20	TB1-20-1	TB1-20-2	SS-G	NOTE: ENCOMPASSES 18, 19			-----
20	16	GRAY	K7-12	CM2-7	CF2-7	-----	-----	-----	-----	-----
22	16	WHITE	TB1-22-1	GC-2	-----	-----	-----	-----	-----	-----
23	16	GRAY	SW2-1	SW3-11	-----	-----	-----	-----	-----	-----
24	16	GRAY	S2-2	I 1	S2-2	I 2	-----	-----	-----	-----
25	16	GRAY	S3-9	I 3-3	S3-9	I 4-3	S3-9	I 5-3	-----	-----
26	16	GRAY	M7 (+)	CF2-8	CM2-8	K7-5	-----	-----	-----	-----
28	16	GRAY	SS-12	K6-8	-----	-----	-----	-----	-----	-----
29	16	GRAY	FP	CF1-16	CM1-16	TB1-21-2	TB1-21B-1	K6-4	-----	-----
29B	16	GRAY	TB1-21b-2	CM2-31	CF2-31	SW5-1	-----	-----	-----	-----
30	16	GRAY	S3-6	M8 (I)	S3-6	M6 (I)	-----	-----	-----	-----
31	14	GRAY	S3-6	M5 (I)	-----	-----	-----	-----	-----	-----
32	16	GRAY	SS-11	K5-6	-----	-----	-----	-----	-----	-----
34	16	GRAY	K4-11	CM2-9	CF2-9	I 3-2	-----	-----	-----	-----
35	16	GRAY	K5-11	CM2-10	CF2-10	I 4-2	-----	-----	-----	-----
36	16	GRAY	K6-11	CM2-11	CF2-11	I 5-2	-----	-----	-----	-----
37	14	GRAY	BC (-)	TB1-22b-1	-----	-----	-----	-----	-----	-----
38	16	GRAY	S2 (-)	M9 (I)	-----	-----	-----	-----	-----	-----
39	14	GRAY	M9 (S)	BC (+)	-----	-----	-----	-----	-----	-----
40	16	GRAY	K6-9	CM2-13	CF2-13	M8 (G)	-----	-----	-----	-----
41	16	GRAY	M6 (G)	M8 (G)	-----	-----	-----	-----	-----	-----
44	16	GRAY	M5 (G)	M6 (G)	M6 (G)	M7 (-)	-----	-----	-----	-----
45	16	GRAY	M6 (G)	I 3-1	-----	-----	-----	-----	-----	-----
46	16	GRAY	M8 (G)	I 4-1	-----	-----	-----	-----	-----	-----
47	16	GRAY	M8 (G)	I 5-1	-----	-----	-----	-----	-----	-----
48	16	BLACK	TB1-48-2	CM1-17	CF1-17	GEN (+)	-----	-----	-----	-----
49	16	WHITE	TB1-49-2	CM1-18	CF1-18	GEN (-)	-----	-----	-----	-----
50	16	GRAY	K4S-3	CM1-24	CF1-24	CM2-36	CF2-36	K4S-3	-----	-----
50A	16	GRAY	M1 (+)	INST. DOOR	-----	-----	-----	-----	-----	-----
50B	16	GRAY	M8 (G)	SW8-1	-----	-----	-----	-----	-----	-----
51	16	GRAY	F1-1	CB5-1	-----	-----	-----	-----	-----	-----
52	16	GRAY	F2-1	CB5-3	-----	-----	-----	-----	-----	-----
53	16	GRAY	F3-1	CB5-5	-----	-----	-----	-----	-----	-----
57	16	BLACK	TB2-1-2	CT1-X1	-----	-----	-----	-----	-----	-----
58	16	RED	TB2-2-3	CT2-X1	-----	-----	-----	-----	-----	-----
59	16	BLUE	TB2-3-2	CT3-X1	-----	-----	-----	-----	-----	-----
67	16	GRAY	SW1-14	CF2-14	CM2-14	XDR-3	-----	-----	-----	-----
68	16	GRAY	SW1-20	CF2-15	CM2-15	CDR-6	-----	-----	-----	-----
69	16	GRAY	SW1-16	CF2-16	CM2-16	XDR-9	-----	-----	-----	-----

#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
70	16	GRAY	F1-2	VR-3	-----	-----	-----	-----	-----	-----
71	16	GRAY	F1-2	CM2-17	CF2-17	SW1-1	-----	-----	-----	-----
72	16	GRAY	F2-2	CM2-18	CF2-18	SW1-7	-----	-----	-----	-----
73	16	GRAY	F3-2	CM2-19	CF2-19	SW1-5	-----	-----	-----	-----
74	16	GRAY	F7-2	VR-4	-----	-----	-----	-----	-----	-----
75	16	GRAY	SW1-3	M2-1	-----	-----	-----	-----	-----	-----
76	16	GRAY	PTB2-12	CM2-20	CF2-20	M2 (+)	-----	-----	-----	-----
77	16	GRAY	PTB2-12	K7-9	-----	-----	-----	-----	-----	-----
78	16	GRAY	M1	SW1-19	-----	-----	-----	-----	-----	-----
79	16	GRAY	M1 (+)	SW1-13	-----	-----	-----	-----	-----	-----
80	16	GRAY	M1 (+)	CF2-21	CM2-21	TB2-6-1	-----	-----	-----	-----
81	16	GRAY	M3	CF2-22	CM2-22	XDR-16	-----	-----	-----	-----
82	16	GRAY	M3	CF2-23	CM2-23	XDR-15	-----	-----	-----	-----
83	16	GRAY	M4	SW1-8	-----	-----	-----	-----	-----	-----
84	16	GRAY	M4	SW1-6	-----	-----	-----	-----	-----	-----
85	16	BLACK	R1-MIN	CF3-24	CM3-24	VR-7	-----	-----	-----	-----
86	16	WHITE	R1-MAX	CF3-25	CM3-25	VR-6	-----	-----	-----	-----
87	16	GRAY	PTB2-10	XDR-11	-----	-----	-----	-----	-----	-----
88	16	GRAY	F2-3	TDM-1	-----	-----	-----	-----	-----	-----
89	16	GRAY	K7-6	TDM-2	-----	-----	-----	-----	-----	-----
90	12	GREEN	TB2-4-1	GB-1	-----	-----	-----	-----	-----	-----
91	16	GREEN	TB2-4-2	CT1-X2	-----	-----	-----	-----	-----	-----
92	16	GREEN	TB2-5-2	CT2-X2	-----	-----	-----	-----	-----	-----
93	16	GREEN	TB2-6-2	CT3-X2	-----	-----	-----	-----	-----	-----
94	16	GRAY	F1-3	XDR-2	-----	-----	-----	-----	-----	-----
95	16	GRAY	F3-3	XDR-8	-----	-----	-----	-----	-----	-----
96	16	GRAY	F8-1	CM4-1	CF4-1	J5-B	-----	-----	-----	-----
97	16	GRAY	BC-L	F8-3	-----	-----	-----	-----	-----	-----
98	16	GRAY	PTB-10	CM4-2	CF4-2	J5-C	-----	-----	-----	-----
99	16	GRAY	F8-2	CM3-1	CF3-1	I 10-2	-----	-----	-----	-----
106	16	GRAY	CB1-2	CM3-3	CF3-3	I 6-2	-----	-----	-----	-----
108	12	WHITE	PTB2-8	CM4-3	CF4-3	J2-N	-----	-----	-----	-----
109	12	WHITE	PTB2-8	CM4-4	CF4-4	J3-N	-----	-----	-----	-----
110	6	WHITE	PTB2-8	CM4-5	CF4-5	CAPPED	-----	-----	-----	-----
111	6	BLACK	PTB1-L1	CB5-2	-----	-----	-----	-----	-----	-----
112	6	RED	PTB1-L2	CB5-4	-----	-----	-----	-----	-----	-----
113	6	BLUE	PTB2-L3	CB5-6	-----	-----	-----	-----	-----	-----
114	12	GREEN	J2-G	CM4-6	CF4-6	GB-3	-----	-----	-----	-----
115	12	GREEN	J3-G	CM4-7	CF4-7	GB-5	-----	-----	-----	-----
116	16	GRAY	CB2-2	CM3-5	CF3-5	I 7-2	-----	-----	-----	-----
117	16	GRAY	PTB2-12	CM3-6	CF3-6	I 6-1	I 7-1	I 8-1	I 9-1	I 10-1
118	6	GREEN	GB-9	CM4-7	CF4-7	CAPPED	-----	-----	-----	-----
119	12	GREEN	GB-11	CM4-9	CF4-9	J5-B	-----	-----	-----	-----
126	16	GRAY	CB3-2	CM3-7	CF3-7	I 8-2	-----	-----	-----	-----
128	16	GRAY	CB4-2	CM3-8	CF3-8	I 9-2	-----	-----	-----	-----
131	6	BLACK	CB1-1	PTB1-2	-----	-----	-----	-----	-----	-----
132	6	RED	CB1-3	PTB1-8	-----	-----	-----	-----	-----	-----
133	6	BLUE	CB1-5	PTB2-2	-----	-----	-----	-----	-----	-----
139	16	GRAY	F9-1	PTB1-3	-----	-----	-----	-----	-----	-----
141	12	BLACK	CB2-1	PTB1-1	-----	-----	-----	-----	-----	-----
142	12	RED	CB3-1	PTB1-7	-----	-----	-----	-----	-----	-----
145	12	BLACK	CB2-2	CM4-10	CF4-10	J2-L	-----	-----	-----	-----
146	12	RED	CB3-2	CM4-11	CF4-11	J3-L	-----	-----	-----	-----
149	16	GRAY	F9-3	CM3-9	CF3-9	I 6-3	I 7-3	I 8-3	I 9-3	I 10-3
151	6	BLACK	CB4-1	PTB1-4	-----	-----	-----	-----	-----	-----
152	6	RED	CB4-3	PTB1-10	-----	-----	-----	-----	-----	-----
153	6	BLUE	CB4-5	PTB2-4	-----	-----	-----	-----	-----	-----

Figure FO-10. Wire List
Genset
Sheet 1 of 2
FP-27/FP-28 blank

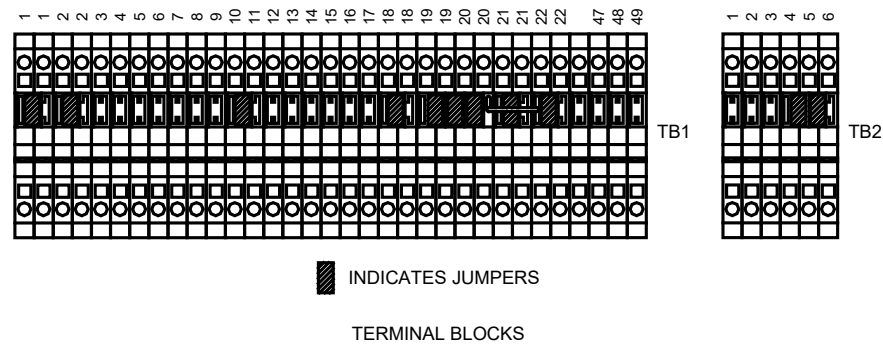
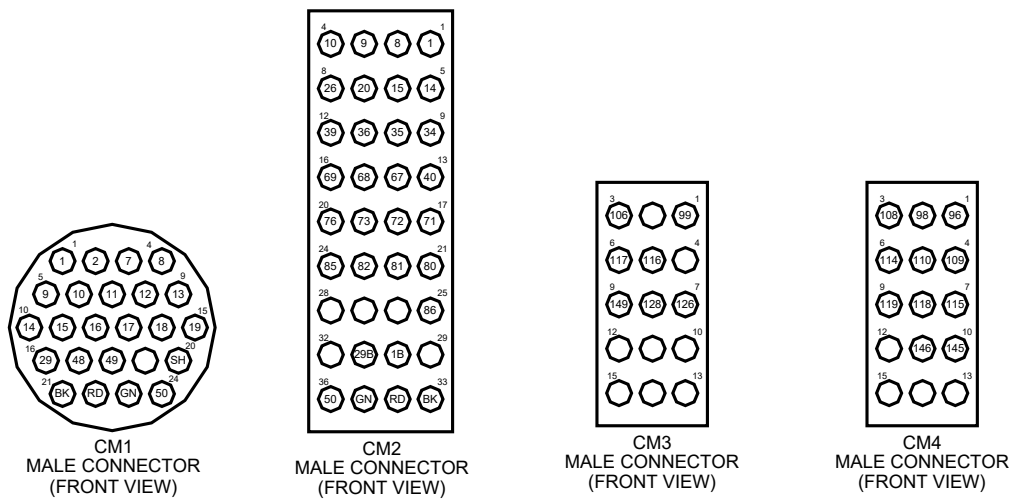
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200	16	GRAY	F3-2	F7-2	-----	-----	-----	-----	-----	-----
201	16	GRAY	K7-8	K4-2	-----	-----	-----	-----	-----	-----
202	16	GRAY	K7-14	K6-6	-----	-----	-----	-----	-----	-----
203	16	GRAY	K4-7	K4-1	-----	-----	-----	-----	-----	-----
204	16	GRAY	K4-4	K5-4	-----	-----	-----	-----	-----	-----
205	16	GRAY	K4-7	K5-7	-----	-----	-----	-----	-----	-----
206	16	GRAY	K4-3	K4-10	-----	-----	-----	-----	-----	-----
207	16	GRAY	K4-12	K5-9	-----	-----	-----	-----	-----	-----
208	16	GRAY	K5-1	K6-1	-----	-----	-----	-----	-----	-----
209	16	GRAY	K5-8	K6-7	-----	-----	-----	-----	-----	-----
210	16	GRAY	K5-3	K5-10	-----	-----	-----	-----	-----	-----
211	16	GRAY	K5-12	K6-12	-----	-----	-----	-----	-----	-----
212	16	GRAY	K6-3	K6-10	-----	-----	-----	-----	-----	-----
213	16	GRAY	SS-1	SS-12	-----	-----	-----	-----	-----	-----
214	16	GRAY	SS-2	SS-G	-----	-----	-----	-----	-----	-----
217	6	GREEN	PTB2-N	GB-15	-----	-----	-----	-----	-----	-----
218	6	GREEN	GB-13	GGL-GND	-----	-----	-----	-----	-----	-----
SH	— —		GB-2	GGL-GND	NOTE: ENCOMPASSES 218, 247, 248, 249, 250					-----
219	10	GREEN	GB-L2	CHASSIS	-----	-----	-----	-----	-----	-----
220	6	GREEN	GB-16	J1-G	-----	-----	-----	-----	-----	-----
SH	— —		J1-BOLT	CB-4	NOTE: ENCOMPASSES 220, 221, 226, 228, 230					-----
221	6	BLK#4	PTB2-11	J1-N	-----	-----	-----	-----	-----	-----
225	2	BLACK	J6-2	BATT 2(-)	-----	-----	-----	-----	-----	-----
226	2	RED	J6-1	BATT 1(-)	-----	-----	-----	-----	-----	-----
227	16	GRAY	TB1-2b-2	TB1-22-2	-----	-----	-----	-----	-----	-----
228	6	BLK#1	CB1-2	J1-A	-----	-----	-----	-----	-----	-----
229	6	BLK#2	CB1-4	J1-B	-----	-----	-----	-----	-----	-----
230	6	BLK#3	CB1-6	J1-C	-----	-----	-----	-----	-----	-----
231	10	GREEN	K2S-2	EBGL	-----	-----	-----	-----	-----	-----
232	10	GREEN	ALT-3	EBGL	-----	-----	-----	-----	-----	-----
233	16	BLACK	TB1-18-1	GC-8	-----	-----	-----	-----	-----	-----
234	16	WHITE	TB1-19B-1	GC-4	-----	-----	-----	-----	-----	-----
235	14	GRAY	GP	K3S-1	-----	-----	-----	-----	-----	-----
236	16	GRAY	TB1-21-1	GC-1	-----	-----	-----	-----	-----	-----
237	16	BLACK	VR-F+	TB1-48-1	-----	-----	-----	-----	-----	-----
238	16	WHITE	VR-F-	TB1-49-1	-----	-----	-----	-----	-----	-----
239	16	GRAY	XDR-1	TB2-1-1	-----	-----	-----	-----	-----	-----
240	16	GRAY	XDR-4	TB2-2-1	-----	-----	-----	-----	-----	-----
241	16	GRAY	XDR-7	TB2-3-1	-----	-----	-----	-----	-----	-----
242	14	GRAY	TB1-2-1	SS-2	-----	-----	-----	-----	-----	-----
243	10	RED	K2S-1	STR-1	-----	-----	-----	-----	-----	-----
244	8	RED	K2S-4	STR-2	-----	-----	-----	-----	-----	-----
245	14	GRAY	K2S-4	K3S-4	-----	-----	-----	-----	-----	-----
246	16	GRAY	K2S-2	K3S-2	-----	-----	-----	-----	-----	-----
247	6	BLK#4	PTB2-TP4	GEN-T4	-----	-----	-----	-----	-----	-----
248	6	BLK#1	CB5-1	GEN-T7	-----	-----	-----	-----	-----	-----
249	6	BLK#2	CB5-3	GEN-T8	-----	-----	-----	-----	-----	-----
250	6	BLK#3	CB5-5	GEN-T9	-----	-----	-----	-----	-----	-----
251	6	GREEN	GB-7	J4-G	-----	-----	-----	-----	-----	-----
252	6	BLACK	CB4-2	J4-A	-----	-----	-----	-----	-----	-----
253	6	RED	CB4-4	J4-B	-----	-----	-----	-----	-----	-----
254	6	BLUE	CB4-6	J4-C	-----	-----	-----	-----	-----	-----
255	6	WHITE	PTB2-9	J4-N	-----	-----	-----	-----	-----	-----

#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
328	16	GRAY	BC-N	PTB2-10	-----	-----	-----	-----	-----	-----
333	12	GREEN	BC-GND	GB-3	-----	-----	-----	-----	-----	-----
334	16	GRAY	-----	-----	-----	-----	-----	-----	-----	-----

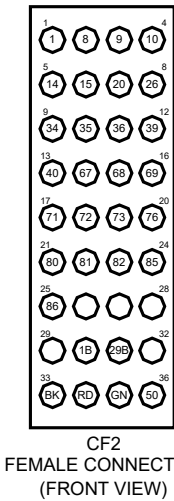
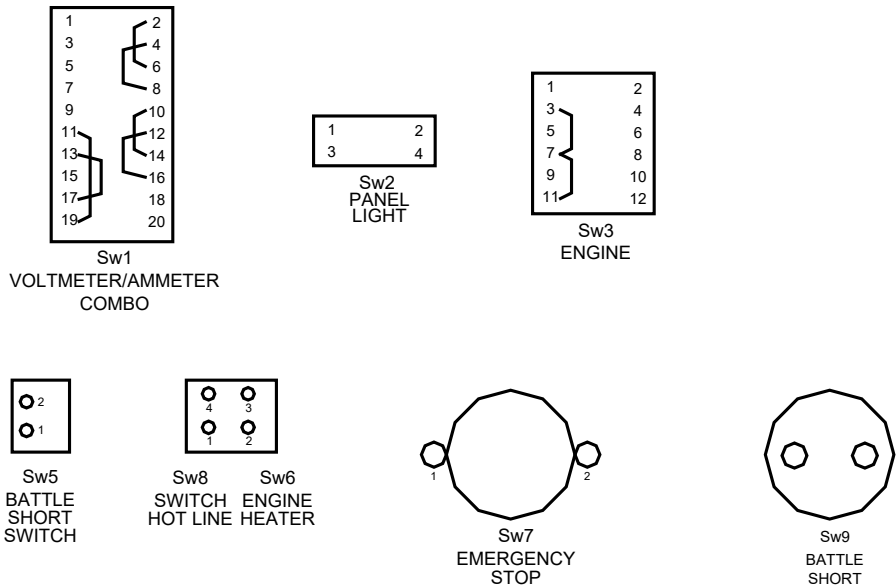
#	GAGE	COLOR	TO	FROM	TO	FROM	TO	FROM	TO	FROM
401		RED	CB-1	K4S-1	-----	-----	-----	-----	-----	-----
402		RED	K4S-4	FLH-1	-----	-----	-----	-----	-----	-----
403		RED	BAT 1 (+)	CB-2	-----	-----	-----	-----	-----	-----
404		RED	BAT 1 (+)	STR-2	-----	-----	-----	-----	-----	-----
406		BLACK	BAT 2(-)	EBGL	-----	-----	-----	-----	-----	-----
407		GREEN	FLH-2	EBGL	-----	-----	-----	-----	-----	-----
408		GREEN	K4S-2	EBGL	-----	-----	-----	-----	-----	-----
409		GREEN	WEB-2	EBGL	-----	-----	-----	-----	-----	-----
410		GREEN	GB-6	GB-8	-----	-----	-----	-----	-----	-----
424		RED	S6-2	S8-2	-----	-----	-----	-----	-----	-----
425		GRAY	S6-1	S8-1	-----	-----	-----	-----	-----	-----
426		GRAY	S8-4	S8-3	-----	-----	-----	-----	-----	-----

#	GAGE	COLOR	TO	FROM
BK		BLACK	WEB-X1-1	S6-3
GN		GREEN	WEB-X1-5	S6-4
RD		RED	FSB-F	S6-2
RD1		RED	K3S	RD2 RD3
RD2		RED	FSB-B	RD1
RD3		RED	FSB-E	RD1
RD4		RED	FSB-A	WEB-X2-1
YL		YELLOW	FSB-C	WEB-X1-2
BR		BROWN	409	WEB-X2-2
BR1		BROWN	409	FP-2
BL		BLUE	FP	WEB-X1-6

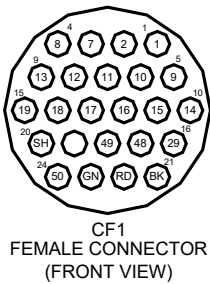
Figure FO-10. Wire List
Genset
Sheet 2 of 2
FP-29/FP-30 blank



BARRIER PANEL

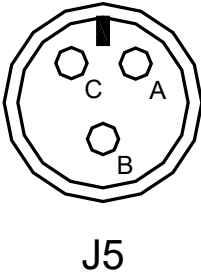
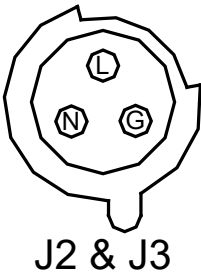
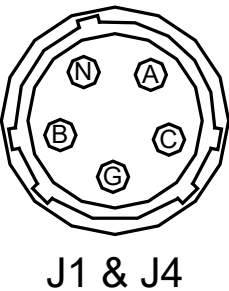
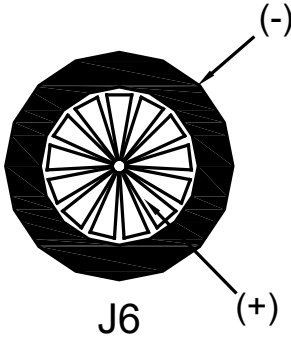
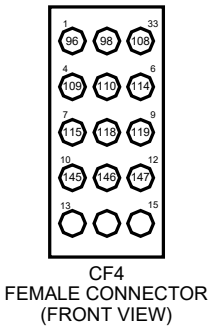
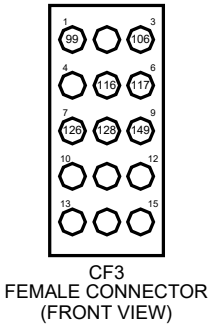


CONTROL PANEL



ENGINE HARNESS

Figure FO-11. Genset Connectors
Sheet 1 of 2
FP-31/FP-32 Blank



POWER DISTRIBUTION PANEL

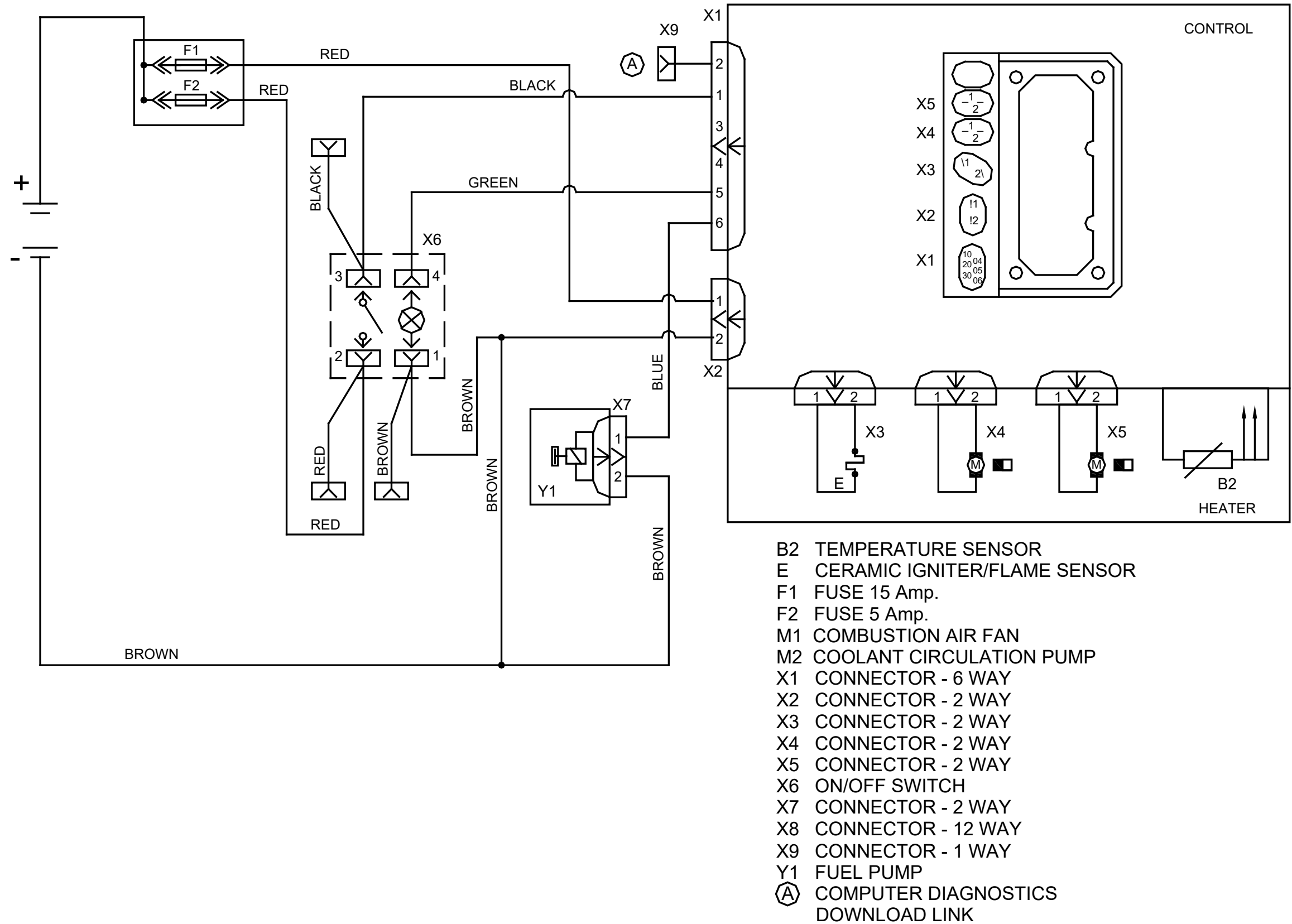
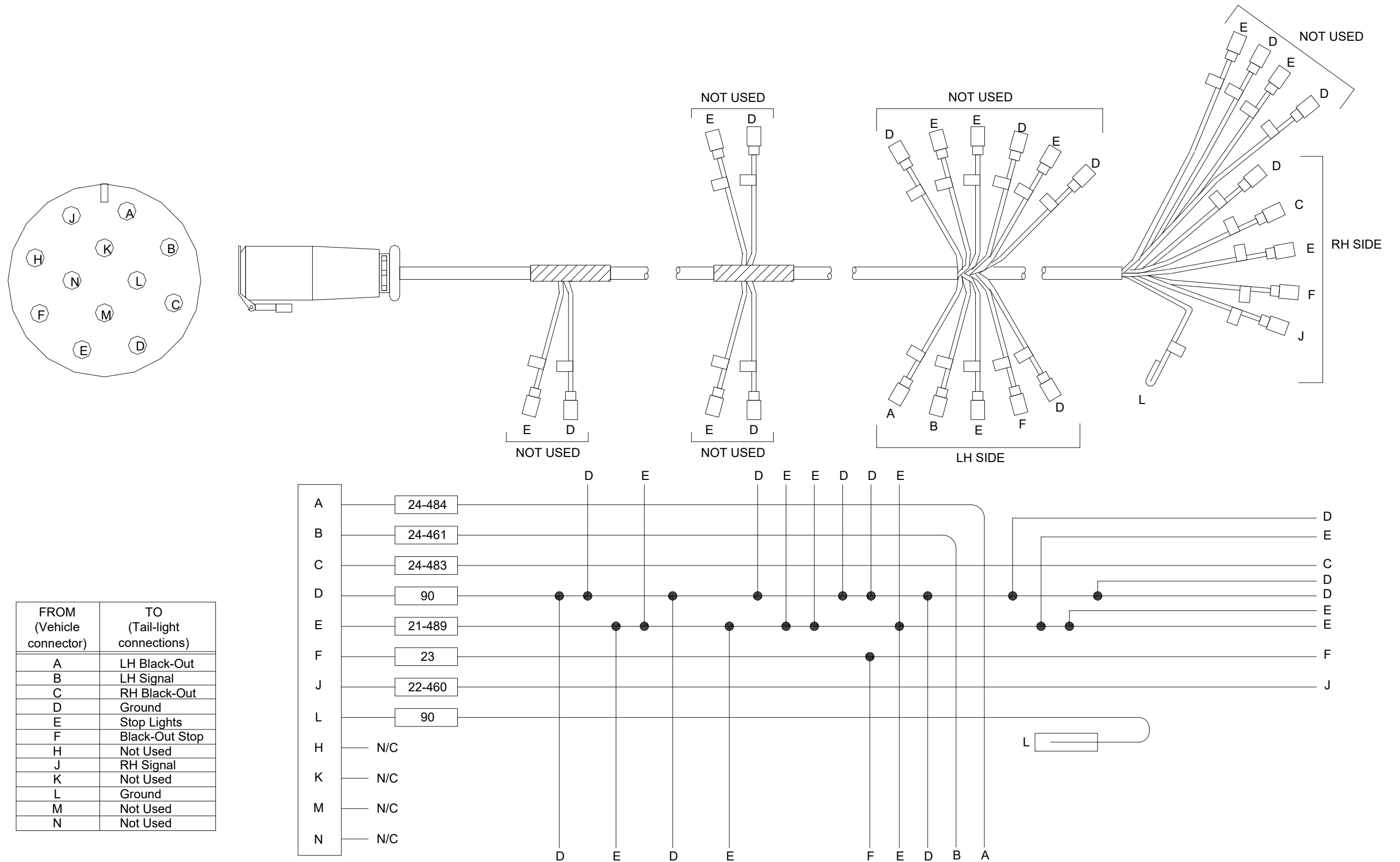


Figure FO-12. Schematic
Hydronic Heater



**Figure FO-13. Wiring Diagram
Inter-Vehicular cable (LED)**

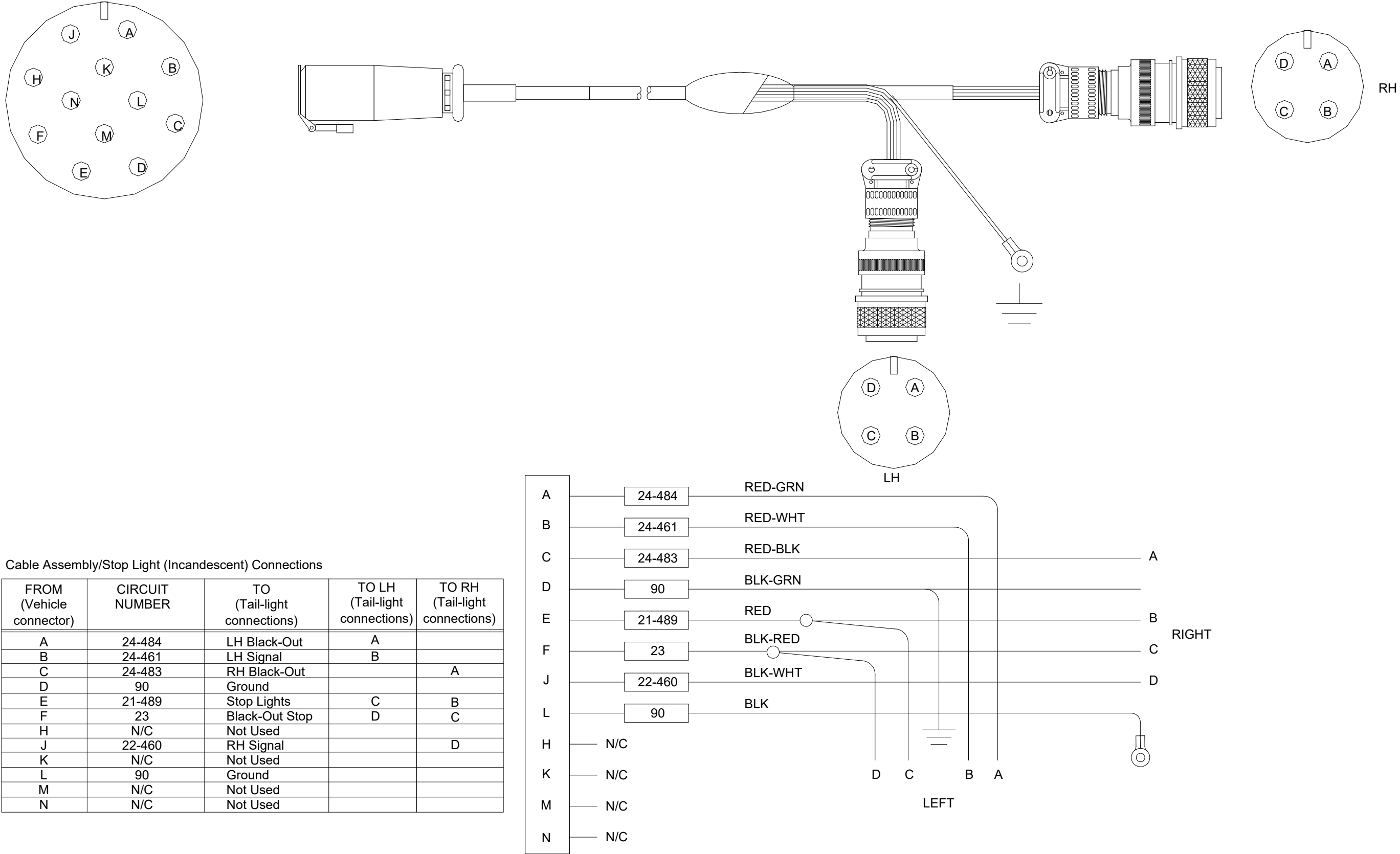


Figure FO-14. Schematic
Wiring Diagram
Inter-Vehicular cable (Incandescent)